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ABSTRACT

In the past decade, the job of sanitarian aide has come into existence. As with any new field, job descriptions vary greatly from employer to employer, The aim of this publication is to provide base data of benefit to persons developing curricula for sanitarian aide training programs; to employers; and sanitarian aides developing job responsibilities and duties. This publication is the result of a research study to determine this information. A questionnaire concerning competency need factors for sanitarian aides, sent out to Iowa and Nebraska personnel, provides the data for the list of standards presented in the book. Two appendices at the end of the book include a sample two-year curriculum for sanitarian aides and the survey instrument. (Author/MA)

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Job Competency Needs of

SANITARIAN AIDES

Developed by Community Services Division, lowa Western Community College, Council Bluffs, in cooperation with

The lowa Department of Public Instruction

1975

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Under a research project funded by Part C, P. L. 90-576



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PREFACE

Job Competency Needs of Sanitarian Aides was a research study undertaken to provide base data of benefit to persons developing curricula for sanitarian aide training programs. Employers and sanitarian aides also will be provided data upon which to develop job responsibilities and duties.

Limited copies of this publication are available without charge from the State Director, Career Education Division, Department of Public Instruction, Grimes State Office Building, Des Moines, Iowa 50319.

The activity which is the subject of this report was supported in whole or in part by the U. S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education, and no official endorsement by the U. S. Office of Education should be inferred.

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Research Assistant Alan Wagner has been a great help and inspiration. His help has been invaluable and is deeply appreciated.

Lastly, I must acknowledge the efforts of my wife, Everall, for her assistance in tabulating and in typing the rough drafts and for her patience in the lost evenings and weekends which I invested in this work rather than in our home and family.

H. C. Pengra Principal Investigator

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GHAPTER I

PRESENTATION OF THE PROBLEM

Introduction

A study of the history of public health and environmental work in the United States reveals the fact that a position entitled Sanitarian Aide has emerged primarily within the past decade. Prior to the 1960's almost no reference is made in the technical journals relative to this position. In the professional writings of the later 1960's, however, frequent reference is made to a position variously entitled as Sanitary Assistant, Environmentalist I, Deputy Inspector, and Sanitary Officer to name a few.

Since the position, Sanitarian Aide, is relatively new in this country it is not surprising that the job descriptions and duties vary widely among employers and supervisors. Because of the wide diversity of the descriptions of this position, the comprehensive job description found in the <u>Dictionary of Occupational Titles</u> was used to form the basis for this study.

The job description found in the <u>Dictionary of Occupational Titles</u> is as follows:

SANITARY INSPECTOR (gov. ser.) 168.287

sanitarian aid. Investigates public and private establishments, such as restaurants, hotels, homes, cafeterias and places of public gatherings, to determine compliance with or violation of public sanitation laws and regulations; makes unannounced visits to various institutions to insure regulations are being followed. Inspects eating and drinking establishments for cleanliness, and determines if vermine or other pests, such as rats or mice, are present. Takes samples of such materials as water, food, and air and performs or orders chemical, physical or biological tests to determine contamination.

Issues violation notices and corrective orders when violations are found. Assists SANITARIAN (profess and kin) in conducting phases of environmental health programs. 1.

This, then, is the job description of the sanitarian aide used in this study. While many other titles could have been used, the writer felt these other titles usually indicated a too narrow degree of specialization. The title, Sanitarian Aide, utilized in this paper indicates a position which requires the side to have some knowledge and ability in those areas of environmental and public health work in which a professional sanitarian is required to have expertise. While the professional sanitarian invests at least four years in formal educational preparation, the aide or para-professional, with less than a baccalaureate degree, is usually employed at an entry level position.

Statement of the Study

At the present time there appears to be widespread diversity concerning the duties and responsibilities for the position of sanitarian aide. Since there apparently exists almost no research relative to the duties and responsibilities of the sanitarian aide, curriculum writers have little evidence other than their own experience upon which to base their curriculum decisions. With a base of research data, more effective learning experiences to be developed for the training of sanitarian aides by curriculum designers. The lack of research has also created difficulty for both employers and sanitarian aides relative to the responsibilities and duties of this position. The lack of precision in the job description and duties of the sanitarian aide has contributed to either the under or over-utilization of the worker employed in this position.

U.S., Department of Labor, <u>Dictionary of Occupational Titles</u>, Third Edition (Washington: Government Printing Office, 1965), I, p. 626.

The purpose of the study is to identify job competency needs of Sanitarian Aides in the field of environmental sanitation and to assemble the data acquired in matrix form that educators may use for curriculum development.

This study provides curriculum writers with additional criteria upon which to base effective education and training programs for sanitarian aides. Employers and sanitarian aides will also be provided with basic data upon which to develop job responsibilities.

Definition of Terms

Sanitarian Aide: A person with a high school or equivalent education trained in environmental control techniques to work as a para-professional under the supervision of a professional sanitarian.

<u>Professional Sanitarian:</u> A person with a minimum of a Bachelor's Degree in natural sciences and registered with the National Association of Environmental Sanitarians and/or another equal certifying agency in the nield of environmental control.

Limitations of the Study

The survey population of this study is limited to those persons in supervisory control of the position, Sanitarian Aide, in the states of Iowa and Nebraska. The determination was made that the size of the population to be surveyed in these two states would be sufficient to give adequate data.

The survey is limited to local and county boards of health and their environmental sanitation supervisory personnel. The respondent for the local and county boards of health in each case was the chairman or vice-chairman. An inquiry of the Nebraska State Health Department indicated there was no counterpart of these boards in Nebraska. Therefore, the survey population was limited to only the environmental sanitation supervisory personnel in the State of Nebraska.



The method used to gather the necessary data presented another limitation. Because of the limits of time, financial resources, and physical endurance, the writer found it necessary to gather the required data through the use of a mailed questionnaire.

CHAPTER II

SURVEY OF LITERATURE.

The survey of literature has covered the publications of the health and environment-oriented organizations of the United States of America. The technical journals and publications of the organizations referred to above were located in the public libraries of Council Bluffs, Iowa; Omaha, Nebraska; and the college libraries of Iowa Western Community College and the University of Nebraska at Omaha. No references were located which met the criteria set forth in the definition in Chapter I.

The American Journal of Public Health reports on the utilization of health aides. The health aides referred to in this article are unemployed, untrained persons who could be utilized to some extent in official health agency settings. The article designs a "conceptual framework" in which the health aide might be effectively utilized. An earlier issue of the same publication refers to new health careers. This article proposes to utilize otherwise. unemployed and/or socially depressed people who need the social status of a career rather than an entry level job with no chance for personal satisfaction or improvement.

Several other articles were located which discussed similar concepts.

However, nothing was located relevant to job competency needs of sanitarian aides.

²Anthony Lenzer, "New Health Careers for the Poor", American Journal of Public Health, 60:1:45-50, 1970.



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Lawrence B. Callan, "A Conceptual Framework for Consideration in the Utilization of Health Aides", American Journal of Public Health, 61:5:979-987, 1971.

The National Association of Environmental Sanitarians furnished a proposed two-year preparatory curriculum.³ This curriculum has in it an introduction which states in part:

The conference was attended by twenty-one people from academic institutions with two-year or four-year programs in environmental health, from agencies that employ environmental health technicians and sanitarians, and by persons experienced or knowledgeable in training and curriculum development. This conference was held because of the manpower needs in the field of environmental health. There is an increasing utilization of and need for two-year trained environmental control, and by industry. The community colleges developing programs for training environmental technicians need curriculum guidelines. The prediction for future manpower needs, and programs to train people to meet these needs, make the development of curriculum guidelines even more critical. (See Appendix A).

Several branches of the Department of Health, Education, and Welfare were contacted and the writer has had extensive correspondence with several schools of public health. While this phase of the study has been extremely time-consuming, the resultant correspondence is quoted since it sheds light as to the present data available related to the position of sanitarian aide.

Dr. C. H. Lawrence, Ph.D., Associate Professor of the Department of Environmental Health, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma informed us:

Your letter of January 15, to the Dean of the Collège of Health has been forwarded to the Department of Environmental Health for action. Unfortunately, we know of no literature review on the subject of "Competency Needs of Sanitarian Aides". We do, however, suggest that you contact Dr. Robert V. Garner, Oklahoma Environmental Information and Media Center, East Central State College, Ada, Oklahoma 74820.

As suggested, correspondence with Dr. Robert Garner was initiated, and he states:

³ Two Year Curriculum Environmental Health Technician. A Conference Report, Atlanta, Georgia. National Environmental Health Association & U.S. Public Health Service, May 27, 1970.

Our personned in the School of Environmental Science has been interested in the program you mentioned also. However, in their search for this same information very little has been found. In most of what has been uncovered has been just personal conversations with employed Sanitarians. From their interviews it appears that the working interest of being employed determines the competency of any Aides that he might employ.

• Dr. J. W. Mason, Acting Chairman of the Department of Environmental Health Sciences of Tulane University, School of Public Health and Tropical Medicine at New Orleans, Louisiana states:

To my knowledge, the Florida System of community colleges offers a program in air and water pollution technology at the Brevard County Community College - which is (or was) operated with the help of the Department of Environmental Engineering at the University of Florida in Gainesville, Florida. Dr. Robert Sholtes was involved in the early phases and, I assume they considered "competency needs" in designing their curricula. Bob has since left the University, however, they should be able to provide you with a forwarding address.

Tulane has not been engaged in the area, thus we have no first hand information to offer.

A letter to Dr. Robert Sholtes was apparently not forwarded to his present address. Therefore, follow-up was incomplete on this suggestion.

In response to continued inquiry of the School of Public Health of the University of Texas at Houston, Dean Reuel Stallones responded:

In response to your request for literature on the competency needs of sanitarian aides, I am sorry but I do not know of anything. I am referring your letter to Dr. Hémphill on our staff for direct reply to you, and I also suggest that you ask the people at the University of California School of Public Health at Berkeley.

Dr. F. M. Hemphill, also of the University of Texas at Houston, emphasizes the lack of research on Sanitarian Aides in his letter, a part of which is quoted here.

Dr. Reuel A. Stallones has requested that I respond to your inquiry about the "competency needs" of sanitarian aides. I know of no literature which makes reference

to "sanitarian aides" per se. Enclosed is all the information I could find which is in some way associated with related occupations.

Professor Walter Jopke, Division of Environmental Health and Safety,
University Health Service of the University of Minnesota, answered the writer's
inquiry as follows:

Your letter regarding the competency needs of sanitarian aides has been forwarded to me for reply. Since we do not, at the University, offer any particular curriculum relating to sanitarian aides, it was necessary for ne to do a little inquiring with other colleges in this area.

The first suggestion I would make is that you write to the . National Environmental Health Association, 1600 Pennsylvania Street, Denver, Colorado 80203, and request a copy of their "Recommended Qualifications and Employment Standards for . Environmental Health Personnel." This will give some background information and help you evaluate some of the environmental health needs for your study.

Last week the faculty of the local Anoka County College and Hennepin Junior College met with us and representatives from Industry to determine the interest for sanitarian aides or trainees. It is our feeling that, unless it's a large health agency whereby these aides can be used for sampling, nuisances and so forth, there appears to be no need for them. However, it was interesting to note the interests of industry, (represented by Northern States Power Company, General Mills, Honeywell, Pollution Curbs and the State Pollution Control Agency) apparently are different. Each industry had their own course requirements depending upon, for instance, a sampling program of air, water, waste, computer needs, etc., and it was difficult to put all of these courses into a two-year college level course. In any case, there is some interest from industry for this type of personnel.

Some of the faculty of the above-named colleges will be proceeding with this program and we should have further information from them.

Sorry that I do not have any more information. However, I hope that this information will be of some help.

Professor Cornelius W. Kruse of John Hopkins University, School of Hygiene and Public Health, states in part:

Unfortunately we do not have any literature on this subject but suggest you contact Dr. R. W. Jones, Chief, Foreign Students



Education Branch, Bureau of Health Profession Education and Manpower Training, 330 C Street, S.W., Washington D.O. 20201. He made an Environmental Health Manpower Study with special emphasis on "competency needs" of all kinds of personnel.

Dr. Jones was contacted by both correspondence and telephone. He was interested enough in this project to photocopy a large portion of his doctoral dissertation. This was thoroughly reviewed. This excellent work describes the educational background of the public health employees in the State of Maryland and it projects probable future needs in the same areas. Dr. Jones is one of the most noted authorities on public health training in this country and his work reveals the need for competency studies. He reports that in Maryland 20.6% of the sanitarians are without college degrees while 35.1% of the aides have completed one to four years of college work.

Robert W. Jones III, "Maryland Environmental Health Manpower Projection 1980" (unpublished Doctoral dissertation, John Hopkins University, 1969), pp. 92-97.

CHAPTER III

METHODS AND PROCEDURES

The purpose of this chapter is to present the methods and procedures employed in this study to amass, order, and analyze the data of the respondents selected to participate in the study.

The Population of the Study

The total population selected to participate in phase one of the study was 245. The total population for phase two of the study was 250. The reason for the change in the survey population was due to the personnel changes in the various health departments included in the survey.

Table I displays the population numbers mailed and numbers returned. The population is divided into the five divisions used throughout the study.

NUMBER OF SURVEY INSTRUMENTS MAILED AND RETURNED
CATEGORIZED BY QUESTIONNAIRE AND SURVEY POPULATION SUBDIVISION

•		_			A	
POPULATION	PH	ASE I		PHASE	II,	
DIVISION	QUESTI	ONNAIRE I	QUESTIC	NNAIRE II	QUESTIO	NNAIRE III
₹.* •	SENT	RETURNED	SENT	RETURNED	SENT	RETURNED
· Lowa Board	110	- 52	109	50'	109	45 .
lowa Administrators	25	- 1₽	24	. 15	24	15,
Jowa Sanitarians	48	52	54~	¹ 35	³ 54	39 ,
Nebr. Administrators	19	19	. 28	12	28	. 13 ;
Nebr. Sanitarians	43	29 .	35	. 20 -	35	10 /
TOTAL	. 245	163	250	132	250	122
% Returned	66.53		52.80	·	48.80	
Returned Unusable		22 .	,	19		. 17
Grand Total Returned		185		151	•	. 139
% Accounted for	75.51	,	60.40	89	55.60	
• ,						

All vevels of government were represented in the survey population since the sanitarian aide would be an employee of a local, county, state, or Federal agency. The board of health chairmen were requested to complete the survey instrument to provide an opinion of major employers of what job competency needs are required.

The administrators and sanitarians within the survey population were requested to complete the questionnaire to provide their respective opinions relative to the job competency requirements of the sanitarian aide. This broad spectrum of opinions of supervisors, directors or administrators, and employers or board members provides a better foundation for the conclusions drawn in Chapter V than could be drawn from a narrow survey population.

The administrators and sanitarians of Nebraska and Iowa were surveyed to give a comparision of their opinions as to job requirements. Iowa does not have a professional sanitarian registration law. Nebraska has had such law in effect for several years. Consequently all administrators and sanitarians surveyed in Nebraska are registered professional sanitarians while many in Iowa are not. It was deemed desirable to compare the competencies expected of the aides in Iowa and Nebraska since the potential supervisors in one state must meet registration standards which are not required in the other.

Development of the Survey Instrument

Early in the study it became evident that the potential knowledges and abilities of the Sanitarian Aide were numerous and varied. A questionnaire which would thoroughly survey all the potential skills required of the sanitarian aide would be so cumbersome and unwieldly that response from the population would be discouraged rather than enhanced. It was decided to divide the research into smaller modules to encourage the respondents to

grouped into five modules. The first questionnaire was based upon the first module. The second and third questionnaires were of the same format except that they were longer and covered two modules each.

The first survey instrument had 65 questions. The second survey instrument consisted of 124 questions and the third had 120. This totals 309 questions asked each of the respondents.

The respondent was provided three possible responses of varying degrees of importance to each question. These possible responses were: A, Very Necessary; B, Desirable; C, Not applicable. It should be noted this survey instrument was not designed to gather data on the frequency of use of these competencies but upon the necessity of having them. Some of the competencies listed in the questionnaire are used seldomly. For example, only twice in 20 years has the writer had to do the epidemiology of a possible rabies outbreak in humans. Knowledge of how to handle these potentially critical situations was invaluable.

The first ten questions were considered personal attributes of a sanitarian aide. The other 299 questions of the three questionnaires were taken from codes, ordinances, and regulations used in the work areas of the sanitarian aide. The 299 questions were divided into twenty subject areas in which the sanitarian aide might be expected to work. The subject areas were separated and displayed on the questionnaires. The first questionnaire contained 66 questions. The first ten mentioned above, the remaining 56 are on the subjects of private water supplies, private sewage systems, nuisance complaints, and eating and drinking establishments.

The second survey instrument contained 124 questions on the subjects of air pollution, solid waste control, industrial noise, water pollution control,



inspection and milk inspection. The third and last survey instrument contained 120 questions on the subject of housing inspection, rodent control, occupational safety inspection, radiological inspection, industrial sanitation, insect control, animal control, and institutional inspection.

The survey instruments were field tested. The field test was conducted by submitting the questionnaire to two board members, two administrators, and two sanitarians. Each item was checked for appropriateness of wording, clarity of item construction, and comprehensiveness of possible responses.

Suggestions received from the field trial were incorporated into the final survey instrument. Copies of the final survey instruments appear in Appendix C.

Collection of the Data

The questionnaires were printed on the inside of a double sheet of paper with a cover letter printed on the front. The name and address of each member of the survey population was typed onto the cover letter. This provided a positive identification of each respondent. A self-addressed stamped envelope was included and the packet of materials was mailed.

Treatment of the Data

and placed in the proper sub-group category. The responses contained in each questionnaire were recorded on specially-constructed worksheets.

Accumulated totals and percentages of the responses were computed for each item of the questionnaire.

To enable the investigator to analyze the data, a numerical value was assigned to each of the three possible responses. Response A, Very necessary,

was assigned the numerical value 3; response B, Desirable, was assigned 2; and response C, Not Applicable, was assigned the value of 1. The Competency Needs Factor (CNF) has computed for each item of the questionnaire for each subgroup of the population surveyed. For example, on item #1, nine Iowa health department administrators indicated "A", two indicated "B", none indicated "C". This gave a weighted score of 31 from 11 respondents. The CNF for item #1 for this sub-group was computed at 2.82. The highest CNF possible in this study is 3.00 and the lowest CNF is 1.00. From the worksheets, the CNF was calculated for each of the 309 items for the five sub-populations of the survey.

CHAPTER IV

FINDINGS OF THE STUDY

This chapter will provide the reader with a display of the assembled data of the study. The assembled data are provided by total population, by the individual Iowa sub-groups, and by the individual Nebraska sub-groups. In addition, a table of comparison between the Iowa and Nebraska populations is provided for each item of the survey instrument.

The competency need factor of each item is listed in descending order in the left hand column in all but the final table. In these same tables the second and third columns provide the survey item number and item description respectively,

The tables include the entire responses. In the final table the items are listed in ascending numerical order in the first column to the left with the CNF in the second column and the description to the right. This final table was included because Nebraska has had a professional registration law for public health sanitarians in effect for several years. Iowa has no such law. The comparisons found in the displayed material in Table VIII should be of interest to many in Environmental and Public Health work.

The total survey population selected to participate in this study are the Boards of Health Chairmen of Iowa and the Health Department Administrators and practicing Sanitarians of Iowa and Nebraska. This divided the survey population into five sub-groups as indicated in Table I.

Since the subject to be researched is so extensive the determination was made to use three questionnaires. These were mailed several weeks apart to the total survey population. Due to the time span involved the survey population varied between 245 and 250 individuals. The percentage of returns predictably went down on each questionnaire mailing. For the first survey 75.51% were returned. On the second survey 60:40% were returned and on the third survey 55.60% were accounted for.

There were unusable returns in each survey. These were due to people leaving the specified geographical area or leaving the profession for retirement or other endeavors. Several were returned as undeliverable. Therefore, in Table I the "% Reported" and the "% Accounted for" are not equal.

TABLE II

Table II displays the data amassed from the total returned questionnaires of 417. The respondents indicated their opinions as to the necessity of a sanitarian aide to attain each listed competency. These CNF's are arranged in descending order of importance.

TABLE II

COMPETENCY NEED FACTORS IN DECENDING ORDER OF IMPORTANCE BY THE TOTAL SURVEY POPULATION

•	•				•
	Item			Item	
CNF	No	Item Description	CNF		Them Description
ONT	NO	rtem beschiption	, CNF	No.	Item Description
2 07	/ 3	D. 55	•	-	T
2.87	43	Difference between sani-		53	Inspect eating and drinking
•	1	tary & unsanitary condi-].	establishments
		tions		ı	•
			2.71	205	Accepted safeguards for
2.82	1	Knowledge of codes	•		various poisons
					•
2.81	10	Cooperate with other	2.70	24	Sample water supplies •
		departments	_•	39	Recognize sewage system
		, .		37	failure
2.80	. 2	Public relations .	•	124	Types of chemicals used
2.00	5			124	
		Dependable work habits			for emergency chlorination
	41	Recognize public health		210	Recognize rodent harbor
		nuisance .			ages
	_	•			
2.78	27	Public Health hazards	2.69	20	Disinfect a water system
,		of contaminated system		63	Recognize acceptable re-
	116	Take legal water samples	· ·		frigeration facilities
		same regar waser samples	•	`133 .	Recognize health hazards
2.77	14	Recognize need of dis-		133 .	at summer camps
2.71		infection ,			at summer camps
	•	THIECCION	0.60	2	· · · · · · · · · · · · · · · · · · ·
0.76	<u> </u>		2.68	3	Write meaningful reports
2.76	65	Recognize good per-	<u> </u>	17	Recognize cross connections
	•	sonal hygiene	1	_	
		. ,	67. گير	171	Run field tests of chlorine
2.75	34	Recognize acceptable		•	and pH
	-	sewage installation	,		P
	64	Recognize safe and unsafe	2.66	4	Personal hygiene
		food handling procedures		16 [^]	Recognize types of wells
	138	Recognize cross connec-		· 56	Sanitation of multi-use
		tions between water and			utensils .
		šewage systems	**	57 ·	Recognize single service
~	. 191	Recognize acceptable '		٥,	utensils
	, , _	toilet facilities	v	276	Recognize mosquito breed- λ
•		tollet facilities		270	
0 7/	22	Towns of the state			ing areas
2.74	33	Inspect existing sewage			
	•	systems	2.64	7 .	Methods of gathering and
	128	Sample chlorinated water	•		preserving evidence
	·163	Take legal swimming pool		` 54	Recognize cross connections
,		water samples			in plumbing
				62	Control of pathogenic
2.73	60	Control pests in food			organisms in food
		service establishments	, .	93	Know sanitary landfill
,p=			,		standards
2.71	18	Sanitary precautions for	•	296	Ability to recognize un-
4./ [, () \			230	
	22	each type of well	•		clean conditions by sight
	23	Routes of contamination		`	and smell
,		in wells			•

TABLE	II - C	Continued			
	Item	,	•	Item	
CNF	No.	Item Description	CNF	No.	Item Description
2.63	125	Ability to define "potable water"	•	181	Ability to take legal milk samples
	211	Know standards for storing materials to deter rodents		203. 269	Know rat proofing methods Know proper use of insect- icides
2.62	193 267	Ability to recognize acceptable bathing facilities Know insects of public		274	Know sanitary storage methods of insect breed ing materials
•	-	health importance	2.56	194	Understand the defini-
2.61	61	Recognize hazardous chemi- cals and know their uses	2,50	1,74	tions in the State Housing Code
	135	Understand vector control in camps	•	207	Know effective rat proof- ing methods
	165	Understand relationship of pH to chlorine	. 2.55	i 30 '	Understand and apply
	282	Know proper procedures in a human rabies ex-	₩.		standards for semi-public water and sewage systems
á io	100	posure	•	160	Know the meaning of "High- free Residual Chlorine"
2.60	190	Ability to recognize acceptable kitchen facilities	2.354.	. 26	Know the procedure to seal
,	275	Know mosquito control methods	. ₹ \$	28	an abandoned well Know and have the ability
2.59	- '	Run field test for dis-	,		to apply standards to privies
2:37	٠ ,	infectant residual Understand pasteuriza- tion, sanitation, and sterilization	<i>er</i> ,	42	Ability to assist pet owners in fly, rodent, and odor control
•	293	Know epidemiological procedures for zoonosis	2.53	289	Know how to handle a rabid animal
2,58	119"	Knowledge of techniques used to treat water	2.52	22	Ability to inspect and recognize each type of well
•	164	Understand algae control	,	•	construction
` >	273	Know materials in which flies will lay eggs		96 4 99	Knowledge of vector control Understand community-wide
		illes will tay eggs		77	solid waste control methods
2.57	52 `	Ability to run field tests on dishwashing machines and sanitizing	-	188	Know farm storage milk tem- perature requirements
· •	59 ◆	solutions Ability to evaluate cleanliness of vending	2.51	51	Understand the S.N.F. stan- dards relative to food ser- vice equipment
•	0.7	machines *	ر د	251	Ability to recognize dan-
. 40	87	Know proper compaction and cover procedures	y of the last.	A.,	gerous situations in indus- trial plants'
•	173	Understand use of chlorine, alum and soda ash		252	Know good housekeeping , practices.



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TARLE	11 - (Continued			
	Item	*		Item	
CNF	No.	¿Item Description	CNF	No	Thom Deposit tion
CHT	no.	ricem bescription	CNT		Item Description
2 50	20	Ab. 21 2 Ab			•
2.50	29 .	Ability to accomplish	2.45	8	Knowledge of enforcement
•	-	percolation tests			procedures -
	_, 123	Ability to do a sanitary		85 [°]	Know how to control blow
•		survey of water supply	•		paper
•	262	Know which state department		200 ,	Know meaning of deteri-
7		is responsible in case of an		200 ,	
		an industrial accident		ð	orated and dilapidated
•	287	Ability to cooperate with		256	Ability to work with
	207	Ability to cooperate with	:		plant safety office
•		Humane Society		•	•
		. • • • • • • • • • • • • • • • • • • •	2.44	172	Know requirements of
2.49	146	Know the mode of trans			safety equipment
		mission of vector-borne.		208	· Know diseases spread by
		diseases :	`	200	
	149	Understand dog and cat-	•	0.50	rodents to man
	147	control ordinances used		258	Recognize conditions caus-
					ing disabilities and acci-
		in human rabies cases			dents
	198	Know plumbing fixtures		266	Know major disease spread
3		required in dwellings			to man by insect
,	2 0 9	Know house mouse control			to man by mocet
• ***		methods	2.43	195	Vnov the responsibilities
		•	2.43	ענד	Know the responsibilities
2.48	98	Know refuse control	•		of owners of dwelling
2.40	90		ř <u>.</u>	295	Know the route of infection
		measure at camps and	''		transmission in nursing
	-	transient lodging facil-			homes
•		ities			
	142	Understand and be able	2.42	25	Ability to interpret water
	•	to explain use of pest-		-	supply analysis reports
		icides in camps		71	Name five major sources of
•	225°	Know where protective		, 1	
	,\ ⁻	clothing must be worn		01	air pollution
· .	226	_		81	Understand air pollution
,	220	Know when safety equip-			warnings, alerts, and
		ment must be readily			emergencies ·
•		available		114	Know the level of decibels
	2 <i>7</i> •7	Understand water ponding		•	that causes some permanent
		control as a mosquito			hearing loss
		control tool		117	Know the functions of a
	2 8 5	Know evidence of lack of		11/	reservoir
	203	sanitary manure storage		`1 20	
• ,		Samitary manufe Storage	4	132	Ability to apply sanitary
à 10	100	7			standards to migratory
2.46	186	Know the significance of	•		labor camps / · ·
		coliform bacteria in pas-		136	Understand electrical,
, ,	*	teurized milk			sewage, and water hookups
	192	Ability to recognize accept-			in public campsites
		able sleeping facilities		152	Understand the difference
•	196	Know the responsibilities	•	172	_
**		of occupants of dwelling	, ,	,	between aerobic and an-
	272		•	170	aerobic bacteria
	212	Know intermediate hosts		1 7 8	Know bacterial and chemical
:		of insects of public health			standards for both raw and
1.0		importance			pasteurized milk
, , ,	294	Know modes of transmission		212	Ability to recognize re-
, , ,	,•	for salmonella from pets			stricted substances by name
	•	to human			Juliance of Hame
•					,



		Continued .		Item	
, ave	Item	. The December	CNF	No.	Item Description
CNF.	No.	Item Description .	CIVE	110.	· ·
2.42	218	Know necessity of rat	2,37.	143	Ability to recognize fire
(Cont		watering points	4 2431	172	safety hazards in motels
(COILE	u)	watering points	,)		and hotels
2 / 1	168	Understand bacterial	l	197	Ability to recognize ade-
2.41	100	standards and their	•		quate heating facilities
		application:			quate nearing ranning
	245	Ability to cooperate	2.36	38	Know lagoon maintenance
	243	with Civil Defense De-	2.30	30	requirements .
,		partment in catastrophe		100	*Understand definition of
		parement in catastrophe		100 .	noise as compared to sound
2.40	6	Knowledge of the profes-		141 *	Understand fire regula-
2.40		sional jargon of the	•	.,	tions and standards
		discipline		145	Know the reservoir of com-
•	35	Know the basis of lagoon		210	municable disease endemic
,	3,7	operation.			to the area
	97 .	Knowledge of sanitation	•	148	Understand the relationship
•		at a transfer station		-/-	between wild animal popula-
	144	Recognize type and ap-			tion and rabies
	144	plication of fire ex-		185	Understand relationship, of
		tinquishers			cow herd health and human
	167	Know diseases usually	4	` \	disease transmission
_	107	associated with natural		260	Know which agents may cause
,		bathing places .			respiratory disease
	202	Know toxic paint and	•	299	Know proper use of pesti-
	202	toxic preservative			cides in all types of in-
		materials	•		stitutions
<u>۽</u>	228	Know "adequate toilet	•	•	
	220.	facilities" for number	2.35	66	Be able to define air
		of employees			pollution
	271	Understand vector-borne	•	109	Know principal sources of
		disease transmission		• ,	community noises
		•	-	110	Understand noise prevention
2.39	49	Know proper use of her-			methods *
2237	<i>^</i> .	bicides and pesticides	(187	Know the significance of
•	•	in nuisance control		٠, ٠	phosphatase in pasteurized
	. 78	Know the various means		•	milk /
,	• -	used to monitor air pol-		[^]	. /
		lution		257	Recognize agents causing
	169	Understand recirculation	-		disabili⁄ties
		systems		261	Know which agents may affect
	199	Know regulations relative			the skin
	•	to handrails on steps		279	Know naturalistic mosquito
	-				abatement methods
2.38	.30	Know the relationship			•
		between soil types and	2.34	31	Ability to read sanitary
		effluent absorption			plot maps and simple blue-
	189 ·	Know required contact	•		prints
	•	times and strengths of		72	Name the six pollutants
	*	various disinfectants			specified in the Clean Air
_	^ 215	Know how various diseases			Act
-		are transmitted from ro-			
•		dents to man			. •
		2	Я		•

		,			<i>,</i>
OVE	Item			Item	
CNF	No.	' Item Description	CNF	No.	· Item Description
2.34	1.47	Understand definitions of		111	Understand noise abatement
(Cont'	d) '	epidemic, endemic, pandem-		. 010	methods
	170	ic, sylvan and urban		219 · 253	Understand fumigant methods
	170	Ability to interpret analysis results		233	Understand occupational diseases caused by harmful
	220	Know where IOSHA Laws			situations
		apply and where local			, .
		department has respons-	2.30	82	Knowledge of soils
	_	ibility		161	Ability to read and eval-
	250	Ability to run carbon			uate a flow diagram
		monoxide field test		229	Know where eating and
	*	, .			smoking areas are located
2.33	131	Understand standards of			in a plant
		floor space and cubic	•	304	Know proper handling meth-
~	107	air space for occupancy			ods of soiled mops
	137	Ability to recognize ad-	2 20	25	D. 11.
		equate laundry facilities in migrant labor camps	2.29	75	Be able to name three air
•	249	Understand use of pro-		204	pollution control devices Know density and space
	447	tective clothing and de-		, 204	requirements
		vices 3	′ (217	Know how to mix rodent baits
•	264	Have completed Red Cross	1 1	233	Know what protective cloth-
• •		First Aid Training			ing is required in dusty
	305 ′	Know when air gaps are			conditions
		required on plumbing		239	Understand hazards of con-
		fixtures			tinuous X-ray exposure
	306	Know sanitary methods of	2 20	110	7
		disposal of dressings and	2.28	113	Know acceptable standards
		laboratory cultures		2	of noise levels for homes and industry
2.32 .	74	Know three respiratory		139	Know ratio of plumbing-
		diseases that tend to be			fixtures-to-population of
•	,	aggravated by air. pollu-		•	day camps
		tion	•	162	Know cause of mud ball in
	259	Know what safety devices			filters
		are needed in a given		177	Ability to check time and
	060	situation '		,	temperature on both HTST
	268	Know life cycles of in-	•	201	and Batch Pasteurizers
		sects of public health importance		201	Know window and skylight and/or artificial light
•	270	Know how to calculate			required
,	270	ppm and mix insecticides	-		,
	282	Know legal procedure to	2.27	127 .	Understand quality control
		enforce local animal con-		;	methods in water treatment
		trol code	,	'	plants '
•	284	Know local requirements	!/ " !	129 ₅	Knowledge of State Urban
		for restrictions of numbers		´ T	Water-Supply and Sewerage
		of animals	7.	,	Systems Act
				134	Know how to calculate the
2.31	; ⁹	Ability to be a court			volume of water required
		witness ,	•		per person

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	TABLE	II - C	ontinued	.7	٠,	
		Item	• • •	•	Ítem	•
	CNF	No.	Item Description	CNF	No.	Item Description
	CHI	no.	reem reservation	02112	` ,	200m 200001, 2000
	2.27	,214	Know tracking powders and	*	308	Know difference in require-
_	(Cont'		how to use them		500	ments of cross infection .
•	(cong.	~230	Know what "threshold limit .			control in nursing homes
		230	values" are for toxic chem-	•		and hospitals
		1				and nospitars
		022	icals 'T	⁄n nn	100	V1-1
		232	Know significance of oral,	2.22	108	Knowledge of value of
			dermal, and inhalation ex-			sound muffs
	,	- 4 0	posure	, •	140	Know space requirements
		248.	Know what to do in case of			for outdoor campsites
			a radioactive spill		223	
	,	307∙	Know cleaning methods of			causes of hearing loss
		•	refuse chutes and dumb-			
		•	waiters .	2.21	. 32	Ability to design, and size
	,				•	systems to fit existing
	2.26	37	Know lagoon safety require-			conditions
			ments		79	Know several deleterious
		44	Know areas of a community		• • •	effects of air pollution
	3		which exclude specific			other than health effects
	**	•	classes of animals by		151 [°]	
			zoning		131	Understand reproduction and
	,	222	-		100	physiology of bacteria
	•	222	Know the definition of	?.	182	Understand application of the "holding tube"
		025	noise		004	_
		235	Understand radiation ex-		286	Understand acceptable ani-
	*	•	posure			mal feed storage
		,			297	Know illumination standards
	2.25	115	Know the potential ways			for institutional kitchens
			for increasing the usable			•
		•	water supply	2.20	40	• Know the public health
		166	Know recommended depth of	•		hazards of waste disposal
			diving area to height of		Ģ.	system failure ~
	٧	,	diving board		70	Know the effects of meteor-
		221	Know what, decibel range			ology and topography on air
			hearing loss starts			pollution
			_		303	Understand proper location
	2.24	20.6	Ability to recognize			of air intake and exhaust
			Norway Rat and Roof Rat	^		systems
•		302	Know acceptable methods of			,
			cleaning and disinfecting	2.19	86	Understand the significance
•			different kinds of floors	~	٠,	and control of leachate
		309	Understand soiled laundry	1	150	Understand the transmission
		307	handling problems in		7.00	of zoonosis
			·institutions	,	216	- 1
		•	THE CLUMETONS , ,	•	216	Ability to estimate age of
	2 22	102	Aldidon on dest- death-1-		227	rodent signs
٠	2.23	102	Ability to define decibels		227	Understand relationship
		224	Know relationship between			between accident rate and
	•	•	duration of noise exposure		ź=-	housekeeping
		0.00	and decibel level	•	278	Know the flight range of
		288	Know sanitary requirements			various mosquitos
	•		for stockyards			



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Mon	~- ,	Soil California Co.	•		<i>/ '</i>
	Item			Item	•
CNF	No.	Item Description	CNF	No.	· Item Description
2.18	.21	Understand spring develop- ment as a domestic water	2.12	236	Ability to use dosimeter and Geiger counter
	73	source Know the local ambient	,	238	Know the significance of alpha, beta, and gamma
•		air quality standards for each of the six pollutants	•	254	exposure Understand physiological
*	126	Knowledge of the Zone of Aeration	• •	234	distress due to agents in industrial atmosphere
	•	, ex	•	280	.Know zoonosis indigenous
2.17	69	Know what a temperature , inversion is			to wild life of your area
	156	Know the general effects of light on bacteria	2.11	155	Knowledge of active and passive immunity
		Know how to check a leak protector valve	•	263	Ability to evaluate an findustrial hygiene problem
,	183	Know the differential in pressure of raw and pas-	2.10	121	Knowledge of the Continuous
		teurized milk in HTST units		300	Regeneration Process Know and apply occupancy
	213	Abilitý to estimate size of rodent population		,	standards to all types of institutions
	281	Know wild host animal of			
		zoonosis in your area	2.09	255	Understand abnormal stress due to improper work meth- •
2.15	50	Ability to recognize all stages of life cycles of	,		ods
	101	disease vectors Understand undesirable hearing changes as result	2.07	112	Understand application of sound proofing buildings
•	,	of noise levels		231	and offices Understand metric system
•	184 242	Understand mastitis control Know effect of radiation	,	234	of measurements Know how to run field tests
		on living tissue	•		for atmospheric contamina- tion
2.14	77 - 	Know the Ringelmann System of defining visible air		240	Know acceptable disposal sites
	159	pollutants Know the term "Thermal		246	Understand the terms: Electron, Proton, Neutron
•	241	Death Time" Know who is responsible for	•	292	Know epidemiological pro-
	671	disposal of radioactive			cedures for zoonosis
- 1	265	waste Understand use of keys in	2.06	48	Ability to recognize nox- ious weeds
		insect identification	· ,	107	Knowledge of acoustical or sound-absorbing walls
2,13	. 120	Knowledge of the Floatation Process	• •	176	Know how to operate a HTST flow diversion valve

INDLE	II - C	Outtinged	c		,
CNF	Item No.	Item Description	CNF	No.	Item Description
2.06 (Cont	298 .'d)	Know water volume per bed and temperature standards for nursing homes	•	301	Know methods of disinfect- ing operating rooms
. 2.05	174 ·	Be able to calculate and maneuver bathing load	1.97	103	Ability to define frequen- cies in cycles per second
	179	Understand use of vacuum chamber in odor and taste control	1.96	118	Know how to study the flood characteristics of a stream
2.04	89	Ability to calculate	:	158	Knowledge of Cestodes and . Trematodes
2.07		volumes of refuse and cover material	,	244 -	Know fission from fusion
2.03	80	Understand the relation- ship between air pollu-	1.95	11	Ability to calculate volumes of water required at an in- stallation
	105	Knowledge of frequency of noise	1.94	19	Know how to run a "yield and drawdown" test
;	247	Understand "half life" of an isotope	٠	36 .	Ability to size lagoons to a given system
2.02	47 ·	Know the procedures in processing citizen-initi-ated complaints.	1.93	55 291	Ability to size kitchen ventilation systems Know psittacosis control
	58	Ability to evaluate loca- tion of vending machines		271	procedures
	• 67	Know the primary gaseous components in the atmosphere	1.90	¹² .	Ability to calculate peak load of a water system Ability to evaluate com-
	106 157	Know what an ondimeter is Knowledge of intestinal		•	paction equipment
		nematodes	1.88	68	Know what the adiabatic lapse rate is
2.01	290	Know T.B. and brucellosis control methods in dairy cattle	1.87	13	Ability to size systems to meet load requirements
2.00	104	Knowledge of pressure	A .	76	Be able to discuss the synergistic effect of particulate and sulfur
	122	Knowledge of removing	. • .:		dioxide
1.99	84	Knowledge of acceptable roads within the landfill	1.86	180	Know how to calculate logarithmic average of bacterial counts
1.98	243	Have ability to monitor radiation from X-ray machine	1.84	, 237	Understand isotopic forms of elements

TABLE	li - C	Continued		Item	
CNF	· No.	·	CNF,	No.	Item Description
1.82	154 . •	Knowledge of the Fluores- cent Antibody Test	1.64	46	Ability to estimate approximate age of fowl Ability to route pickup
1.79	92 -			<i>70 -</i>	crews .
1 70	, ,	volume of loads	1.51	45 ,	Ability to recognize sex of animals and fowl
1.78	. 94	Knowledge of a Systems Analysis Concept	1.49	83	Ability to operate landfill
:	95	Knowledge of Volume AREductions Systems	1.45	91	equipment Know maintenance procedures
	•	<u>,</u>	1.40	· · · · · · ·	on equipment

Table II reveals six items with a CNF of 2.80 or above. The most needed. skill as judged by the total population is the ability to differentiate between sanitary and unsanitary conditions by the sanitarian aide (#43). Closely following in descending order are knowledge of codes (#1), ability to cooperate with other departments or agencies (#10), public relations (#2), dependable work h_{ij} bits (#5) and the ability to recognize public health nuisances (#41). least desirable competencies needed by the sanitarian aide in the opinions of the respondents are those with a CNF rating below 2.00. Table II shows twentyeight items placed in this category. Starting with the least important in the opinion of the total survey population they are: Knowledge of maintenance procedures on landfill equipment (#91), ability to operate landfill equipment (#83), ability to recognize sex of animals and fowl (#45), ability to estimate approximate age of fowl (#46), ability to route garbage pickup crews (#90), knowledge of a volume reduction system (#95), knowledge of systems concept analysis (#94), and ability to esitmate net weight or volume of refuse on loads. coming to landfill (#92). Other items in this category are found in Table II.

Table III provides the data gathered from the 147 questionnaires received from Iowa board of health chairmen that responded to the questionnaire.

TABLE IÎI

COMPETENCY NEED FACTORS IN DESCENDING ORDER OF IMPORTANCE BY IOWA BOARD OF HEALTH CHAIRMEN

			•		,
	Item	•		Item	•
CNF	No.	Item Description	CNF	No.	Item Description
,	•		. ,		
2.84	165	Understand relationship of	2.70	18	Know the sanitary precautions
•		pH to chlorine	20.0	, - (for each type of well
•	۲,			39	Ability to recognize system
2.83	1 1	Knowledge of codes, laws,		,	failure
2.03	•	rules and regulations per-		93	
		taining to work		. 33 .	dards
		câlulus co wolk			dalus .
2 82	143	Ability to recognize fire	2.69	14	Ability to recognize need of
-}02	143	safety hazards in motels and	2.03	14	disinfection
- 1	,	hotels		16.	
l l		note1,5		10	Ability to recognize different
2 80	116	Ability to take legal water		27	types of wells
, 2,00	110			21	Know the public health hazards
1		samples		22	of a contaminated system
L .78	128	Abilian to sent chlori		33	Ability to inspect existing :
T'' .	. 120	Ability to sample chlori- nated water		/ 1	systems .
•	205	Know accepted safeguards		41	Ability to recognize public
	~ 20 5	•		296	health aspects of a nuisance
	•	for varioús poisons		290	Ability to recognize unclean conditions by sight and smell
.2.77	34	Ability to recognize secont			conditions by sight and smell
.2.11)4	Ability to recognize acceptable installation		110	The state of trade to see
		able installation	2.68	119	Knowledge of techniques used
2.76	191	Ability to recognize accept-	,	133	to treat water
2.70	1) (able toilet facilities		133	Recognize health hazards at
t •	٩	able tollet latilities			summer camps
2.75	2	Ability with public rela-	2.66	20	: Know how to disinfect a water
1 2		tions with public	2.00	20	
•	4	Good personal hygiene		163	source and system .
	43 [.]	Ability to differentiate		103	Ability to take legal swimming
	43	between sanitary and unsani-			pool water samples
-	•	tary conditions	2.64	124	Vaculades of the turns of them
, -		tary conditions	2.04	124	Knowledge of the types of chem-
2.74	1.38	Recognize cross connections	-		icals used for emergency chlor-ination
	130	between water and sewage		120	
·.		systems /	•	130	Understand and apply standards
		Systems			for semi-public water and sewage
ž.72	23	Know the possible routes of		· 2 76	systems .
2.12	2.3	contamination in each type		2/0	Ability to recognize mosquito
		, of well		289	breeding areas
	24	Ability to sample water		209	Know how to handle a rabid
•	~7	supplies			animal
	40	/	2 62	102	Ability to wood-in
	70 (\ ards of waste disposal sys-	2.62	193	Ability to récognize acceptable
		tem failure		, 194	bathing facilities Understand the definitions in
				174	
2.71	5	Dependable work habits	4		the State Housing Code
	,	population work Habits		•	



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TAb	III -	Continued	1 Table	` _ ~-	•
Ov.	Item		مريم الرسم	(Item	
CNF	No	Item Description	CNF	No.	Item Description
2.61	64	Proposition C			The state of the s
2.01	04	Recognize safe and unsafe	2.56	. 144	Recognize_type and application
•	٠.	food handling procedures	(cont	•	of fire extinguishers
2.60	99`	. Understand community with		164	Understand algae control
2.00		Understand community-wide solid waste control methods		210	Ability to recognize rodent
	123	Ability to do a sanitary			harborages '
r	•	survey of water supply		251	Ability to recognize danger-
	171	Ability to run field tests	•		ous situations in industrial
•		for chlorine and pH	,		plants.
	190	♣bility to recognize ac-		261	Know which agents affect the
•		ceptable kitchen facilities		,	skin
	203	Know rat proofing methods	• •	267	Know insects of public health
,	226	Know when safety equip-			importance
		ment must be readily avail-		274	Know sanitary storage methods
•		able		000	of insect breeding materials
	258	Recognize conditions caus-		293	Know how to get samples in safe,
		ing disabilities and acci-		• .	legal manner
		dents	2 5/	17	Abditha be accounted asset
	264	Have completed Red Cross	2.54	17	Ability to recognize cross
	,	First Aid Training		53	connections .
				-	Ability to inspect eating and
2.59	10	Ability to cooperate and			drinking establishments under applicable codes
		work with other departments		60	Understand control of pests in
		and agencies		00	food service establishments
	. 22	Ability to inspect and rec-		87	Know proper compaction and cover
	,	ognize each type of well	•	07	procedures .
	, ,	construction		92	Estimate net weight on volume
•	65	Recognize good personal	•	,	of loads
•		hygiene		125	Ability to define "potable
2 50	100	•			water"
2.58	198	Know plumbing fixtures		141	Understand fire regulations
	260	required in dwellings			and standards
	260	Know which agents may		142	Understand and be able to ex-
	283	cause respiratory disease		•	plain use of pesticides in camps
	203	Know proper procedures in		173	Understand use of chlorine,
		human rabiés exposure			alum and soda ash
2.57	3	Ability to write meaning~		181	Ability to take legal milk
2,3,	٠,	ful and intelligent reports	•		samples
	· 7	Understand methods of gath-			
	•	ering and preserving evi-	2.53	211	Know standards for storing
		dence			materials to deter rodents
	15	Ability to run field test	:	220.	
		for disinfectant residual			and where local department
•	62	Understand the control of	_	0.55	has responsibility
		pathogenic organisms		257	Recognize agents causing
	-	food service establishments		262	disabilities
	•	-		262	Know which state department
2.56	63	Recognize acceptable re-	•		is responsible in case of an
5		frigeration facilities	,	273	industrail accident Know materials in which flies
•	7 l	Name five major sources of		213	will lay eggs.
	,	air pollution	•	•-	140 - 140 -
	•				- 17

mant ti	++÷			•	
TABLE		Continued .		Item	•
CNF	Item No.	Item Description	CNF	No.	Item Description
2.52	26	Know the procedure to seal	2.48	160	Know the meaning of High-free
	•	an abandoned well	(cont		Residual Chlorine"
	47.	. Know the procedures in pro-	.*	•	
		cessing citizen-initiated complaints	2.47	208	Know diseases spread by rodents
	¹ 51	Understand the S.N.F. stan-		266	. Know major disease spread to
	3 -	dards relative to food ser-			man by insect
		vice equipment		270	Know how to calculate ppm and
		· · · · · · · · · · · · · · · · · · ·		•	mix insecticides
2.51	25	Ability to interpret water		· 295	Know the route of infection
		supply analysis reports	•		transmission in nursing homes
	256	Ability to work with plant			
•		safety officer	2.46	31	Ability to read sanitary plot
•	287	Ability to cooperate with	٠,	•	maps and simple blueprints
		Humane Society	•	61	Recognize hazardous chemicals
			_		and know their uses
2.50	52	Ability to run field tests	•	115	Know the potential ways for in-
		on dishwashing machines and			creasing the usable water supply
	i	sanitizing solutions		117	Know the functions of a res-
	78	Know the various means used	-		ervoir
,,		to monitor air pollution		129	Knowledge of State Urban Water
	81	Understand air pollution			Supply and Sewerage Systems Act
		warnings, alerts and emer-	•	132	Ability to apply sanitary stan-
	,	gencies		,	dards to migratory labor camps
				188	. Know farm storage mild temper-
2.49	. 28	Know and have the ability			ature requirements
		to apply standards to privies			
	207	Know effective rat proofing	2.45	35	Know the basis of lagoon operation
•		methods		57	Recognize acceptable single ser-
. *	225	Know where protective cloth-			vice utensils
•		ing must be work			
	259	Know what safety devices	2.44	109	Know principal sources of
•		are needed in a given situa-		,	community noises
	070	tion		, 114	Know the level of decibels that
	272	Know intermediate hosts of		•	causes some permanent hearing
		insects of public health im-		121	loss
	277	portance		, 131	Understand standards of floor space and cubic air space for
•	277	Understand water ponding control as a mosquito con-		·	occupancy
•		trol tool		178	Know bacterial and chemical
.	^	LIGI LOOI		170	standards for both raw and
2.48	6	Knowledge of the profes-		189	Know required contact times and
2.40	U	sional jargon of the disci-		,	strengths of various disinfec-
		pline	, <i>•</i>		tants
,	29	Ability to accomplish per-		196	Know the responsibilities of
		colation tests		2,0	occupants of dwelling
	30	Know the relationship be-		230	Know what "threshold limit
	,	tween soil types and efflu-		, +00	values" are for toxic chemicals.
,		ent absorption	•	299	Know proper use of pesticides
	59	Ability to evaluate clean-			in all types of institutions
		liness of vending machines	*	307	Know cleaning methods of refuse
	98	Know refuse control measure		· •	chutes and dumbwaiters
		at camps and transient lodg-			
		ing facilities			

					•
TABLE	III - Item	Continued		Item	•
CNF.	No.	Item Description	CNF	No.	Item Description
	•		•	•	
/2,43	37	Know lagoon safety require-	2.40	282	Know legal procedure to enforce
•		ments	(cont	'd)	local animal control code
•	42	Ability to assist pet owners		. 🖍	
		fly, rodent, and odor control	2:39	-54-	Ability to recognize cross
, ,	•	•		J	connections in plumbing
. 2.42	100	Understand definition of			connections in planbing
	•	noise as compared to sound	2.38	.38	Know lagoon maintenance require-
,	110	Understand noise prevention	2.30	.30	- /
		methods		82	ments Vnoviledge of Soils
	127.	Understand quality control		139	Knowledge of Soils
		methods in water treatment		139	Know ratio of plumbing-fixtures-
*	-	plants		170	to-population of day camps
	135	Understand vector control	•	172	Know requirements of safety
	•	in camps		100	equipment
	195	Know the rsponsibilities of		192	Ability to recognize acceptable
	.,,	owners of dwelling			sleeping facilities
	200	_ ·		215	Know how various diseases are
	200	Know meaning of deteriorated and dilapidated	,		transmitted from rodents to man
	209			285	Know evidence of lack of sanitary
	. 209	Know house mouse control			manure storage,
4	212	methods		294	Know modes of transmission for
	212	Ability to recognize re-			salmonella from pets to human
•		stricted substances by name			•
	228	Know "adequate toilet facil-	2.36	97	Knowledge of sanitation at a
		ities" for number of em-			transfer station
		ployees		111	Understand noise abatement .
	233	Know what protective cloth-			methods .
		ing is required in dusty		137	Ability to recognize adequate
•	•	conditions	•		laundry facilities in migrant
,	. 245	Ability to cooperate with		• •	labor camps ***
		Civil Defense Department in		146	Know the mode of transmission
		catastrophe	,		of vector-borne diseases
	252	Know`good housekeeping prac-		168 ~	Understand bacterial standards
		tices			and their application
*		* *		248	Know what to do in case of a
2.41	56	Understand sanitizațion of	•	- ;•	radiactive spill
i	•	' multi-use utensils		249.	Understand use of protective
,				/-	clothing and devices
2.40	72	Name the six pollutants spec-			Clothing and devices
•		ified in the Clean Air Act	2.35	49	Know proper use of herbicides
	8.5	Know how to control blow	2.55	47.	
	- *	paper			and pesticides in nuisance
	162	Know cause of mud ball in	,		control
* * 9		filters	2 2/	ď	V1-1
	186.	Know the significance of	2.34	δ .	Knowledge of enforcement pro-
	. ,	coliform bacteria in pasteur-	•		cedures
•		ized milk		66	Be able to define air pollution
مدين	217	. Know how to mix rodent baits	,	169	Understand recirculation systems
, .		Understand fumigant methods		000	•••
	232		2.33	223	Understand occupational causes
	۷۵۷ ،	Know significance of oral,	•		of hearing loss
٠	v	dermal, and inhalation		250	Ability to run carbon monoxide
,	252	exposure			field test .
1	253	Understand occupational dis-		271	Understand vector-borne disease
•		eases caused by harmful sit-		•	transmission
f 5		úations	37		

•		-				
TABLE	III - Item	Continued	5	Item		•
CNF	No.	Item Description	CNF	No.	• Item Descripti	on' .
		,	1 25	4	•	•
2.32	96	Knowledge of vector control	2,27	229 -	Know where eating	and smoking
-	108	Knowledge of value of sound	,- ;	*	areas are located	in a plant
		muffs		288.	Know sanitary requ	irements for .
•	145	Know the reservoir of com-	ž,	₹ *	stockyards	
-	4	municable disease endemic				•
•		to the area	2.26	70 ⁻	Know the effects o	
	167	Know diseases usually asso-	7	•	and topography on	
		ciated with natural bathing	. •	7.3	Know the local amb	ient air
		places ,	•	•	quality standards	for each of the
	306	Know sanitary methods of			six pollutants •	#
		disposal of dressings and		140	Know space require	ments for out-
		laboratory cultures	. 20.		door campsites	
		•	,	166	Know recommended d	
2.31	. 218	Know necessity of rat wa-			area to height of	diving board
	260	tering points	. *	187	Know the significa	
	268	Know life cycles of insects	~ .		phatase in pasteur	ized milk
•	201	of public health importance	_	100	V1-3E	fluorides
	284	Know local requirements for restrictions of numbers of	2.24	122	Knowledge of remov	THE LIGHTIGES
	,			222	Know the definition	n of noise
		animals		263	Ability to evaluat	
2.30	79	Know several deleterious	٠,	203	trial hygiene prob	
2.30	79	effects of air pollution	,	302	Know acceptable me	
		other than health effects		302	cleaning and disir	fecting dif-
•	113	Know acceptable standards		•	ferent kinds of fl	oors
	113	of noise levels for homes				•
		and industry	2.22	120	Knowledge of the F	loatation
	161	Ability to read and eval-		•	Process	
		uate a flow diagram		147	Understand definit	ions of epi-
	177	Ability to check time and	•		demic, endemic, pa	ndemic, sylvan
		temperature on both HTST and	•=	•	and urban	1
		Batch Pasteurizers		170	Ability to interpr	et analysis
	197	Ability to recognize ade-	٠,		results	,
		quate heating facilities		182	Understand applica	tion of the
=	,		-		"holding tube"	-
2.29	199	Know regulations relative		254	Understand physiol	
• '		to handrails on steps			due to agents in i	ndustrial atmo-
	236	Ability to use dosimeter	,		sphere	
		and Geiger counter .		275	Know mosquito cont	
	239	Understand hazards of con-		279	Know naturalistic	mosquito abate~
•		tinuous X-ray exposure	-	200	ment methods	1
9 10	0.0	Abiling to coloulate		309	Understand soiled	
2.28	89	Ability to calculate vol-		-	ing problems in in	STITUTIONS
		umes of refuse and cover	2 21	٠ ٨.٨	Know areas of a co	mmunity which
,	121	material Knowledge of the Continuous	2.21	44	exclude specific	
	141	Regeneration Process ,)	;		animals by zoning	CIASSES UI
	152	Understand the difference	`\		animars by conting	•
	174	between aerobic and anaerobic	2.20	88	Ability to evaluat	e compaction
		bacteria		30	equipment	
		,		126	Knowledge of the \hat{Z}	one of Aeration
		•		,		,



TARIF	TIT _	Continued	4		5 1 " 1
INDLE	Item	Continued		Item	E
CNF	No.	Item Description	CNF	No.	Item Description
2.20 (cont	134 'd)	Know how to calculate the volume of water required per person	2.16. (cont		Understand proper location of air intake and exhaust systems
•	183	Know the differential In ;	2.14	101	Understand undesirable hearing
•	•	pressure of raw and pasteur-	, . ;		changes as result of noise
		ized milk in HTST units	•	•	levels
	235	Understand radiation exposure	`	150	Understand the transmission of
x	255	Understand abnormal stress		156	zoonosis
, ·	308	due to improper work methods Know difference in require-		. 156	Know the general effect of light on bacteria
•	300	ments of cross infection		•	on vacteria
i		control in nursing homes and	2.13	227	Understand relationship between
•,		hospitals	•		accident rate and housekeeping.
*		8		231	Understand metric system of
2.19	13	Ability to size systems to	•		measurements
	00	meet load requirements	.•	240	Know acceptable disposal sites
~	- 32	Ability to design and size systems to fit existing con-		241	Know who is responbile for dis- posal of radioactive waste
•	,-	*ditions	•	278	Know the flight range of various
		410110	`	2,0	mosquitos . '
2.18	9	Ability to be a court witness		5	•
	175	Know how to check a leak	2.12	36	Ability to size lagoons to a
-1		protector valve	_	~	given system
	179	Understand use of vacuum .		77)	Know the Ringelmann System of
•	•	chamber in odor and taste		86	defining visible air pollutants Understand the significance and
	204	Know density and space re-	/	,0	control of leachate
	2,04	quirements		155	Knowledge of active and passive
•	214	Know tracking powders and			immunity
	,	how to use them '			
_	242	Know effect of radiation on	2.10	118	Know how to study the flood
·	280	living tissue Know zoonosis indigenous to		157	characteristics of a stream Knowledge of intestinal dematodes
	200	wild life of your area		137	Miowledge of Intestinal memorates
•	286	Understand acceptable animal	2.09	216	Ability to estimate age of redent
•		feed storage	•		signs
	•	,		234	Know how to run field tests for
2.17	55	Ability to size kitchen ven-			atmospheric contamination
_	•	tilation systems	2 00	11	Ability to coloulate volumes of
2.16	80	Understand the relationship	2.08	11	Ability to calculate volumes of water required at an installation
2.10	00	between air pollutants and	/	58	Ability to evaluate location of
		allergies		_	vending machines
•	102	Ability to define decibels		. 75	Be able to name three air pollu-
	Ì 59 _,	Know the term "Thermal Death			tion control devices
	, ,,,,,	Time"		84	Knowledge dt acceptable roads
	202	Know toxic paint and toxic preservative materials			within the landfill
-	221	Know what decibel range hear-	2.07	213	Ability to estimate size of
•	£ 4 I	ing loss starts	2.07		rodent population
	224	Know the relationship between		297	Know illumination standards for
_		duration of noise exposure and	1		institutional kitchens
•	-	decibel, level		•	

	TABLE `	χ11 – (Continued .	•		
		Ltem			Item-	
	CNF	No.	Item Description	CNF	No.	Item Description
	2.07	300	Know and apply occupancy	1.98	103	Ability to define frequencies
	(cont 1		standards to all types of	1.,,		in cycles per second
	(COIIC	u)	institutions		292	Know epidemiological procedures
		305	Know when air gaps are re-			for zoonosis
		•	quired on plumbing fixtures		301	Know methods of disinfecting
	•	•	quitte on promoting		*	operating rooms
	2.06	50°	Ability to recognize all			
	2.00 (20	stages of life cycles of	1.96	21	Understand spring development .
			disease vectors			as a domestic water source
		69	Know what a temperature	_	76	Be able to discuss the syner-
			inversion is	•		gistic effect of particulate .
	,	105 -	Knowledge of frequency of	*		and sulfur dioxide
			noise	•	153	
		158	Knowledge of Cestodes and			sanitation, and sterilization
			Trematodes •	f	290 .	Know T.B. and brucellosis
	•	176	Know how to operate a HTST	•		control methods in dairy cattle
	•		flow diversion valve.	• •		Y 4
		184	Understand mastitis control	1.92	12	Ability to calculate peak load
	•					of a water system
	2.04	19	Know how to run a "yield and		149	Understand dog and cat control
	; 3.		drawdown" test.			ordinances used in human rabies
		48	Ability to recognize noxious			cases
		. •	weeds .			
		67	Know the primary gaseous com-	_1,91	281	Know wild host animal of
	٠,		ponents in the atmosphere		201	zoonosis in your area
	•	94	Knowledge of a Systems Ana-	Sandar .	291 .	Know psittacosis control pro-
			lysis Concept		-	cedures
		174	Be able to calculate and	1 00	148	Understand the relationship
		001	maneuver bathing load	1.90	140	Between wild animal population
		206	Ability to recognize Norway			and rables
		•	Rat and Roof Rat		154	Knowledge of the Fluorescent
	2 02	7/.	Know three respiratory dis-		134	Antibody Test
	2.02	74	eases that tend to be aggra-			1 1/1/2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	~			1.88	68	Know what the adiabatic Tapse
		106	Know what an ondimeter is	, 1.00		rate is
	•	180	Know how to calculate loga-		95	Knowledge of Volume Reductions
	•	- 00	rithmic average of bacterial		•	Systems ,
•			counts		136	Understand electrical, sewage,
		265	Understand use of keys in	,	•	and water hookups in public
			insect identification	-	• 6	campsites .
					•	
	2.00	104 *	Knowledge of pressure level	1.87	243	Have ability to monitor radiation
,		•	of noise	•	,	from X-ray machine
		238	Know the significance of		•,	
		x	alpha, beta, and gamma ex-	1.84	151	Understand reproduction and
	,		posure .			physiology of bacteria
		244	Know fission from fusion			
		269	Know proper use of insec-	1.82	90	Ability to route pickup crews
	. ,		ticides.	4	247	Understand "half life" of ah
		298	Know water volume per bed		•	isotope
	•	1	and temperature standards		•	
			for nursing home			
			1 A A	3		

7				_ `	
TABLE	111 - (Continued			,
	ltem .	, , , , , , , , , , , , , , , , , , , ,		Item	•
CNF	No.	Item Description	CNF	No.	Item Description '
1.80	201	Know window and skylight and/ or artificial light required	1.59	45	Ability to recognize sex of animals and fowl
1.78 سب	83	Ability to operate landfill equipment	1.58	107	Knowledge of acoustical or sound-absorbing walls
-1:73	237 -246	Understand isotopic forms of elements Understand the term: Elec-	1.51		. Know proper handling methods of soiled mops
•		tron, Proton, Neutron	1.46	. 46	Ability to estimate approx-
1.66	112	Understand application of sound proofing buildings and offices	1.42	185 4	imate age of fowl Understand relationship of
1.62		Know maintenance procedures on equipment		•	cow herd health and human disease transmission

A study of the responses from this population sub-group indicates that four items scored a CNF above 2.79. These are: Ability to take legal water samples (#116), ability to recognize fire and safety fiazards in transient lodging (#143), knowledge of applicable codes, laws, rules, etc. (#1), and understand relationship between pH and chlorine residual in potable water. There are 31 items with a CNF below 2.00 as reported by this population subgroup. The least of these are: Understanding the dairy cow herd health to human disease (#185), ability to estimate approximate age of fow1 (#46), know proper method of handling soiled mops in institutions (#304). The other items as listed by item number 107, 45, 91, 112, 246, 237, and 83 show a CNF of less than 2.00.

Table IV assembles the data from the 41 questionnaires returned by the lowa health department administrators included in the survey.

TABLE IV

COMPETENCY NEED FACTORS IN DECENDING ORDER OF IMPORTANCE BY IOWA BOARD OF HEALTH ADMINISTRATORS

•	Item			Item	:
CNF	No.	Item Description	CNF	No.	Item Description
3.00	2	Public relations		20	Know how to disinfect a
	5 - 24	Dependable work habits Sample water supplies		34	water source and system Ability to recognize accept-
	27	Know the public health haz-			able installation
•	·	ards of a contaminated system		39	Recognize sewage system failure
	40,	Know the public health haz-		-41	Ability to recognize pub-
		ards of waste disposal		•	lic health aspects of a ··
		system failure · .		š	nuisance .
	43	Ability to differentiate		47	Know the procedures in pro-
		between sanitary and un-			cessing citizen-initiated
		sanitary conditions	•	. /	complaints
2.91	> 4	Good personal hygiene		54	Ability to recognize cross connections in plumbing
2.91	17	Ability to recognize cross	•	56	Understand sanitization of
	1,	connections		50	multi-use utensils
•	29	Ability to accomplish per-		57	Recognize acceptable single
		colation tests		r,	service utensils
	33	Ability to inspect exist		59	Ability, to evaluate clean-
		ing system			liness of vending machines
	- 52	Ability to run field tests	10	60 .	Understand control of pests
	3 ^m	on dishwashing machines and			in food service establish-
		-sanitizing solutions		63	ments Recognize acceptable refrig-
	55 -	Ability to inspect eating and drinking establishments		03	eration facilities
		under applicable codes		· 64	Recognize safe and unsafe
_		Auger applicable codes		04	food handling procedures
2.87	131	Understand standards of	• •	65	Recognize good personal .
e .		floor space and cubic air		•	hygiene
		space for occupancy		•	•
•	163		2.80	85	Know how to control blow
1	,	ming pool water samples	` `	100	paper
	191	Ability to recognize accep-		138	Recognize cross connections. between water and sewage.
	210	table toilet facilities Ability to recognize rodent			systems .
٠,	210	harborages		171 .	Ability to run field tests
		, , ,			for chlorine and pH
2.82	1	Knowledge of codes, laws,		186	Know the significance of-
	•*	rules and regulations pertain-	• •		coliform bacteria in pas-
,		ing to work			teurized milk
	, 7	Understand methods of gather-		19 3	Ability to recognize accept-
	7.	ing and preserving evidence		4 · 4	able bathing facilities
	14	Ability to recognize need of disinfection	2.73	10	Ability to cooperate and
	, 18	Know the sanitary precau-	4.13	10,	work with other departments
	10	tions for each type of well	1		and agencies
		the state of the s	•		

			, , , , , , , , , , , , , , , , , , ,			· · · · · · · · · · · · · · · · · · ·
	TABĻE	IV - Item	Continued		4 7 h	
	CNF	No.	Item Description	CNF	Item No.	Item Description
				•		:
*	2.73	15~	Ability to run field test		173	Understand use of chlorine,
	(Cent'	d)	for disinfectant residual		, 44+	alum and soda ash
		16	Ability to recognize dif-		182	Understand application of
	-	,	ferent types of wells			the "holding tube"
		26	Know the procedure to seal		185	Understand relationship of
		`	an abandoned well	•	105	cow herd health and human
		28	Know and have the ability			disease transmission
		•	to apply standards to	•	188	, -
•			privies .		1.00	Know farm storage milk tem-
		42	Ability to assist pet		100	perature requirements
		7.	owners in fly, rodent,		190	Ability to recognize accept-
	4	•	and odor control		10/	able kitchen facilities
		61			194	Understand the definitions
		01	Recognize hazardous chem-		~	in the State Housing Code
		62	icals and know their uses	•	195	Know the responsibilities
		. 02	Understand the control of			of owners of dwelling
	•		pathogenic organisms		196	Know the responsibilities
			food service establish-			of occupants of dwelling
			ments		198	Know plumbing fixtures :
		93	Know sanitary landfill		•	required in dwellings
		0.7	standards		204	Know density and space
		- 97	Knowledge of sanitation	•		requirements .
		105	at a transfer station	**		· · · · · · · · · · · · · · · · · · ·
		125	Ability to define "potable	2.65	_ 3 ~	Ability to write meaningful
		100 4	water"	•	·	and intelligent reports
		128 '	Ability to sample chlor-	,	22**	Ability to inspect and rec-
			inated water			ognize each type of well
		135	Understand vector control			construction
			in camps		23	Know the possible routes
	<u>:</u>	164	Understand algae control			of contamination in each
		165	Understand relationship of	•		type of well
	ž.	, ,	pH to chlorine		30	Know the relationship be-
	· ·	187	Know the significance of			tween soil types and effluent
		_	phosphatase in pasteurized			absorption
	•		milk		51	Understand the S.N.F. stan-
		192 .	Ability to recognize accept-		١	dards relative to food ser-
	,		able sleeping facilities		_	vice equipment
	•	199	Know regulations relative		•	300
			to handrails on steps	2.60	81	Understand, air pollution
		205	Know accepted safeguards			warnings, alerts and emer
		•	for various poisons	•		gencies
^		211	Know standards for storing		87.	Know proper compaction and
	,	•	materials to deter rodents		,	cover procedures
	. 4		•	•	1,30	Understand and apply stan-
	2.66 °,	96	Knowledge of vector control			dards for semi-public water -
		124	Knowledge of the types of		•	and sewage systems
		ø	chemicals used for emer-		181	Ability to take legal milk
•	v. •	-	geney chlorination		•	samples
		133	Recognize health hazards		i 97	Ability to recognize ade-
	1,		at summer camps .			quate heating facilities
	•	136	Understand electrical, sew-	. ,	200	Know meaning of deterior-
	_ /		age, and water hookups in			ated and dilapidated
	`		public campsite's			• , , , , , , , , , , , , , , , , , , ,



•		•			
TABLE	IV - Item	Continued		Item	•
CNF	No.	Item Description	CNF	No.	Item Description
2.60	267	Know insects of public	2.49	99	Understand community-wide
(Cont		health importance	2.47		solid waste control methods
(COHE	273	Know materials in which			, BOTTE WESTE CONSTOL MESTICAS
	213	flies will lay eggs	2.47~	78	Know the various means used
	₄ 276	Ability to recognize mos-	2.47	,,	to monitor air pollution
\	4270	quito breeding areas	, ,	102	Ability to define decibels
7	283	Know proper procedures in	ĺ	119	Knowledge of techniques
}	203	a human rabies exposure		117	used to treat water
	285	Know evidence of lack of		121	Knowledge of the Continuous
	203	sanitary manure storage	•		Regeneration Process
	287	Ability to cooperate with	,	137	Ability to recognize ade-
.♥	20,	Humane Society	•		quate laundry facilities in
•	293	Know how to get samples in			migrant labor camps
		. safe, legal manner		142	Understand and be able to
		. saie, icgai mannei			explain use of pesticides
2.55	6	Knowledge of the profes-	. ,		in camps
4.33	,	signal jargon of the dis-		146	Know the mode of transmission
		cipline		1-10	of vector-borne disease
	8	Knowledge of enforcement		148	Understand the relationship
د		procedures ,	•	,	between wild animal popula-
	37	·	-	٠.,	ation and rabies
	٠,	ments	•	149	Understand dog and cat con-
	38	Know lagoon maintenance			trol ordinances used in
3	50	requirements '	ì	•	human rabies cases
	•			167	
2.53	. 98	Know refuse control mea-	,		ciated with natural bathing
2.53	70	sure at camps and trans-	φ.	•	places
		ient lodging facilities	•	189	Know required contact times
	, 168	Understand bacterial .	1	, ===:	and strengths of various
	200	standards and their appli-	, 7	•	disinfectants
* .*		cation	•	202	Know toxic paint and toxic"
	· 170	Ability to, interpret	•		preservative materials
•	_, ,	analysis results .		212	Ability to recognize restric-
	178	, -			ted substances by name
,/ ₂ ·	1	standards, for both raw and		269	Know proper use of insecti-
•		pasteurized milk .		•	cides
,	201		1 3	275′	Know mosquito control methods
<i>,</i> .••		and/or artificial light		289	Know how, to handle a rabid
		required	€	•	animal
	203	Know rat proofing methods	• • •	304 [°]	Know proper handling methods
•	207	Know effective rat proof-			of soiled mops , ,
		ing methods	•	, '*	
	209	Know house mouse control	2.46	49	Know proper use of herbicides
		methods	•		and pesticides in nuisance
	218	Know necessity of rat	,	4 1	control
•		watering points	• * n		•
	252	Know good housekeeping	2.40	71 '	Name five major sources of
•	_	practices		. •	air pollution *:
•	274	Know sanitary storage		75 * /	Be able to name three air.
		methods of insect breed-			pollution control devices
•	1 1	ing materials	_	100	Understand definition of
	296	Ability to recognize un-	•		noise as compared to sound
•	•	clean conditions by sight	1	109	Know principal sources of
:	. 4	and smell	•		community noises .
	•			•	· ·

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TABLE	IV - (Item	Continued		T 4	·
CNF	No.		CNF	Item No.	Item Description
₹2.		Teem Beschiperon	0112	1101	reem bescription
2.40	117	Know the funtions of a		31	Ability to read sanitary .
(Cont		reservoir		31	plot maps and simple blue-
(000	123	Ability to do a sanitary		•	prints .
		survey of water supply	•	32	Ability to design and size
. ,	143	Ability to recognize fire.	•	<i>32</i> ,	systems to fit existing
•		safety hazards in motels			conditions
		and hotels		35	Know the basis of lagoon
	144	Recognize type and appli-		33	operation
. 7		cation of fire extinguishers		44	Know areas of a community
	1/5	Know the reservoir of		44	which exclude specific
	177	communicable disease	•		classes of animals by
		endemic to the area			_
	150	Understand the transmission			zoning
	120	of zoonosis	2.33	66	Be able to define air
	160		2,33	66	
	160 ,	Know the meaning of "High-		70	pollution 1
	161	free Residual Chlorine"		72	Name the six pollutants
	161,	Ability to read and eval-			specified in the Clean Air
	216	uate a flow diagram		77.	Act
	216	Ability to estimate age		77 .	Know the Ringelmann System
	005	of rodent signs			of defining visible air
	225	Know where protective	,	06	pollutants
	206	clothing must be worn		86	Understand the significance
	, 226	Know when safety equip-	1	100	and control of leachate
•	: ,	ment must be readily		108	Knowledge of value of sound
,		available			muffs
	228	Know "adequate toilet		113	Know the acceptable stan-
, +		facilities" for number of			dards of noise levels for
	005	employees	•		homes and industry
•	235			114	Know the level of decibels
	050	exposure *			that causes some permanent
	250	Ability to run earbon mon-	·	·	hearing loss
		oxide field test		126	Knowledge of the Zone of
. ' '	277	Understand water ponding			Aeration
	*	control as a mosquito		127	Understand quality control
		control tool	· ~		methods in water treatment
\ a	, 284	Know local requirements	*		plants
	, 4	for restrictions of		132 •	Ability to apply sanitary
·		numbers of animals	•	· •.	standards to migratory labor.
. *.	286	Understand acceptable	,		camps
٠.	•	animal feed storage		134	Know how to calculate the
*	294	Know modes of transmission			volume of water required
		for salmonella from pets			per person '
•		to human	1	139	Know ratio of plumbing-
٧,	305	Know when air gaps are			∜fixtures-to-population of
	,	required on plumbing		4	day camps
	. ^ _	fixtures		147	Understand definitions of
•	_	*	, .		epidemic, endemic, pandemic,
2.35	9	Ability to be a court	•		sylvan and urban
	_	witness,		* 151	Understand reproduction and
•	25	Ability to interpret water		".	physiology of bacteria
•	,	supply analysis reports		·	
				:	

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TABLE		Continued		Item	•
ONF	Item No.	Item Description	CNF	No.	Item Description
2.33 (Cont'	152 d)	.Understand the difference between aerobic and an- aerobic bacteria		73	Know the local ambient air quality standards for each of the six pollutants
	153	Understand pasteurization, sanitation, and sterilization		74	Know three respiratory diseases that tend to be aggravated by air pollution
•	184	Understand mastitis control	•	105	Knowledge of frequency of
•	208	Know diseases spread by rodents to man		110	noise Understand noise prevention
	214	Know tracking powders and, how to use them	•	111	methods Understand noise abatement
	236	Ability to use dosimeter and Geiger counter	•	140	methods Know space requirements for
-	` 239	Understand hazards of continuous X-ray exposure		175	outdoor campsites Know how to check a leak
	244	Know fission from fusion		•	protector valve .
	245	Ability to cooperate with Civil Defense Department in catastrophe	•	177	Ability to check time and temperature on both HTST and Batch Pasteurizers
	248	Know what to do in case of a radioactive spill .		183	Know the differential in pressure of raw and pas-
*	249	Understand use of protective clothing and devices	, 4	227	teurized milk in HTST units Understand relationship be-
	253 •	Understand occupational diseases caused by harmful situations		233	tween accident rate and housekeeping Know what protective cloth-
	.258	Recognize conditions caus- ing disabilities and acci-	,	•	ing is required in dusty conditions
 ان المراجع	266	dents Know major disease spread	r	247	Understand "half life" of an isotope
	272	to man by insect Know intermediate hosts of		251	Ability to recognize dan- gerous situations in indus-
	у,	insects of public health importance		256	trial plants Ability to work with plant
	279	Know naturalistic mosquito abatement methods.		262	safety officer Know which state department
	2,82	Know legal procedure to		202	is responsible in case of an industrial accident
• •	•	enforce local animal con- trol code		264	Have completed Red Cross
•	295 <u>.</u>	Know the route of infection transmission in nursing homes		268	First Aid Training Know life cycles of insects of public helth importance
0.56	, .	,		270	Know how to calculate ppm and mix insecticides
2.28	50	Ability to recognize all stages of life.cycles of		271	Understand vector-borne dis-
*		disease vectors	_	278	ease transmission Know the flight range of
2.27 . -	69	Know what a temperature inversion is		288	various mosquitos Know sanitary requirements for stockyards
			-		•

TADIE	. 117	Continued			
TABLE	. Iv - C Item	oncinded		Item	
CNF	No.	Item Description	CNF	No.	Item Description
2.27	290	Know T.B. and brucellosis	2.13	70	Know the effects of meteor-
(Cont'	d)	control methods in dairy cattle	•	•	ology and topography on air pollution
-	' 306	Know sanitary methods of		82	Knowledge of Soils
		disposal of dressings and		84	Knowledge of acceptable
	•	laboratory cultures	•		roads within the landfill
	307	Know cleaning methods of		106	Know what an ondimeter is
		refuse chutes and dumb		174	Be able to calculate and
		-waiters '	•		maneuver bathing load
	309	Understand soiled laundry '		213	Ability to estimate size
		handling problems in in-			of rodent population
		stitutions		224	Know relationship between
					duration of noise exposure
2.25	48	Ability to recognize			and decibel level
		noxious weeds		229	Know where eating and smok-
,					ing areas are located in a
2.20	. 101	Understand undesirable).	0.50.	'plant
	.'	hearing changes as result		259.	Know what safety devices
•	110	of noise levels	,	•	are needed in a given
	112 ,	Understand application		260'	situation
		of sound proofing build-		260′	Know which agents may cause
	141	ings and offices		200	respiratory disease
>	141	Understand fire regu-		280	Know zoonosis indigenous
	156	lations and standards Know the general effects		281	to wild life of your area Know wild host animal of
	100	of light on bacteria		201	
	206	Ability to recognize	,	291	zoonosis in your area Know Psittacosis control
•	200	Norway Rat and Roof Rat		291	procedures
	215	Know how various diseases	**	297	Know illumination standards
	2+3	are transmitted from	4	231	for institutional kitchens
•	4	rodents to man	•	299	Know proper use of pesti-
	221	Know what decibel range			cides in all types of in-
		hearing loss starts		•	stitutions
	222	Know the definition of		308	Know difference in require-
		noise			ments of cross infection
	232	Know the significance of	4	•	control in nursing homes
,		oral, dermal, and inhala-		1	and hospitals
	•	tion exposure	٠,٠		*
100	- 242	Know effect of radiation	2.09	5 8	Ability to evaluate loca- ' .
; ◆		on living Lissue	•		tion of vending machines
	246	· Understand the term:	·		
	١	Electron, Proton, Neutron	2.07	103	Ability to define frequen-
	257	Recognize agents causing	•		cies in cycles per second
-	-	disabilities .	` ~	104	Knowledge of pressure level
	298	Know water volume per bed		•	of noise
• ,	•	and temperature standards		115	Know the potential ways for
• ′		for nursing homes			increasing the usable water
1	303	Understand proper location	· •		supply .
3		of air intake and exhaust		116	Ability to take legal water
		systems		•	samples

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TABLE	IV - C	ontinued .	• >		Item	
CNF	No.	Item Description		CNF	No.	- ·
	155	Transfering 6	•		217	Know how to mix rodent baits
2.07	155	Knowledge of active and			217 •223	Understand occupational
(Cont		passive immunity	• •		*223	
	162	Know cause of mud ball in			007	causes of hearing loss
	•	filters			237	Understand isotopic forms
	166	Know recommended depth of				of elements
		diving area to height of			238	"Know the significance of
		diving board		. •	. • •	alpha, beta, and gamma
•	180,	Know how to calculate			•	exposure
		logarithmic average of	٠,		243	Have ability to monitor
		bacterial counts		•		radiation from X-ray'
*	219	Understand fumigant meth-	١.	•		machine
	:	ods ' '	•	•	263	Ability to evaluate an
	220≠	•			-, 7,5	industrial hygiene prob
	220-	apply and where local de-				1em
	•	,				TCM ,
` ,		partment has responsibil-		1.93	. 68	Vnov what the adiabatic
		itý		1.93	. 00	Know what the adiabatic
	265	Understand use of keys			7.57	lapse rate is
		in insect indentification	4		154	Knowledge of the Fluor-
*	292	Know epidemiological pro-				_ escent Antibody Test
		cedures for zoonosis			157	Knowledge of intestinal
	300	Know and apply occupancy	,	4		nematodes
		standards to all types of			234	Know how to run field tests
		institutions			•	for atmospheric contamin-
•	302	Know acceptable methods		1		ation
		of cleaning and disinfect-			240	 Know acceptable disposal
٠, ٠		ing different kinds of		•		sites '
	•	floors			241	Know who is responsible
•	•		٠,			for disposal of radio-
2.00	21	Understand spring develop-		• •		active waste
2.00		ment as a domestic water			255	Understand abnormal stress
	•	source				due to improper work methods
	[*] 67	Know the primary gaseous			301	Know methods of disinfecting
	07	components in the atmos-			•••	operating rooms
		,				*
	76	phere		1.91	11	Ability to calculate volumes
,	7é .	Be able to discuss the		1.91	1	of water required at an in-
		synergistic effect of				
		particulate and sulfur			10	stallation, '
•		dioxide		, .	12	Ability to calculate peak
	80	Understand the relation-			1.0	load of a water system
		ship between air pollu-			348	Ability to size systems to
•	•	tants and allergies	•		سم .	meet load requirements
	118	Know how to study the	•		36	Ability to size lagoons to \$
	١.	flood characteristics of		•	~	a given system
	• • •	a stream			55	Ability to size kitchen
, '. ·	129	Knowledge of State Urban		o ′	<i>.</i>	ventilation systems
		Water Supply and Sewer-				
• •	ν	age Systems Act	٠	1.87	95	ှာ Knowledge of Volume Reduc-
	159	Know the term "Thermal			•	tions Systems
		Death Time"			. 120	Knowledge of the Floatation
	176	Know how to operate a HTST	,		-	Process
	, _,,	flow diversion valve			230 ·	
•	179	Understand use of vacuum		•		values" are for toxic
•	113	chamber in odor and taste		•		chemīĉals
,		• · · · · · · · · · · · · · · · · · · ·	, -	` ;	_	
		control "		_ 1	•	بو مبر و به

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TABLE		ontinued,		- .	•
	Item	•		Item	
CNF	No.	Item Description	CNF	No.	Item Description
1.87 (Cont	231 'd) 261	Understand metric system of measurements Know which agents may	;	122	Knowledge of removing fluorides from water
`		affect the skin	`1.64	46	Ability to estimate
1.86	169	Understand recirculation	3		approximate age of fowl
•	•	systems 6	1.60	92	Estimate net weight on
1.83	19	Know how to run a "yield			folume of loads
. `		and drawdown" test	-	- 94 ′	Knowledge of Systems
1.80	158	Knowledge of Cestodes and			Analysis Concept
•	1	Trematodes	1.53	172	Know requirements of .
٠,	254	Understand physiological distress due to agents	•	•	safety equipment
• , ,	,	in industrial atmosphere	1.47	79	Know several deleterious
1.73	45	Ability to recognize sex	•		effects of air pollution
	-	of animals and fowl	٠		other than health effects
	_ 88	Ability to evaluate com-		90	Ability to route pickup
•	-5	paction equipment	•		crews
•	107	Knowledge of acoustical.		0.1	
		or sound-absorbing walls	1.27	91	Know maintenance procedures
1 67	89	Ability to calculate			on equipment -

Ability to calculate volumes of refuse and

cover material

This population sub-group places 38 survey items in the CNF category of 2.80 or above. Of these 38 items, this sub-group was unanimous in its opinion (CNF's of 3.00) regarding the importance of six competency needs. The six items are: public relations (#2), dependable work habits (#5), the ability to sample water supplies (#24), knowledge of the public health hazards of contaminated water systems (#27), knowledge of the public health hazards of waste disposal system failure (#40), and the competency to differentiate between sanitary and unsanitary conditions (#43):

The Iowa department administrators place 50 items or 16% of the questions below a CNF of 2.00. Therefore, the reader may wish to question the advisability of including these items in a curriculum for a sanitarian aide.

Table V presents the figures accumulated from the 126 questionnaires

TABLE V

COMPETENCY NEED FACTORS IN DESCENDING ORDER OF IMPORTANCE BY IOWA SANITARIANS

•	•	. ,,			
	İtem	,	,	Item	• •
CNF	No.	Item Description	CNF	No.	Item Description
02.12	,	-			• •
2.94	43	Ability to differentiate		124	Knowledge of the types of
		between sanitary and un-			chemicals used for emer-
		sanitary conditions		•	gency chlorination
~					•
2.92	41	Ability to recognize pub-	2.84	* 39	Ability to recognize sys-
	•	lic health aspects of a		• •	tem failure ·
		nuisance		54	Ability to recognize cross
		•			connections in plumbing
2.90	. 4	Good 'personal hygiene	,	56	Understand sanitization of
	27	Know the public health	ţ	,	multi-use utensils ,
	•	hazards of a contamin-			•
		ated system	2.83	14	, Ability to recognize need
	40	Ķnow the public health			of disinfection
	•	hazards of waste disposal		_. , 86	Understand the significance
•		system failure	•		and control of leachate
	53	Ability to inspect eating			
۲.		and drinking establishments	2.82	1	Khowledge of codes, laws,
		under applicable codes			rules and regulations per-
	64	Recognize safe and unsafe	•	٠	taining to work
		food handling procedures		, ,	Ability to write meaningful
	•		2.80	٠	and intelligent reports
2.89	2 ',	Ability with public re-		171	Ability to run field tests
		lations and with public		1/1	for chlorine and pH
•	33	Ability to inspect exist			TOT CHILDITING and pro
	34	ing systems Ability to recognize	2:79	17	Ability to recógnize cross
	34	acceptable installation	(``	connections
-		acceptable installation	;	*	
2.88	24	Ability to sample water	2.78	20	Know how to disinfect a
2.00	47	supplies			water source and system
	60	Understand control of	•	•	_
•		pests in food service	2.77	18	Know the sanitary precautions
		estáblishments .	1	•	for each type of well
•	62 '	Understand the control of	,	' 85	Know how to control blow;
		pathogenic organisms in ^		•	paper
**	•	food service establish-	•	87	Know proper compaction and
		ments	•		cover procedures
•	63	Recognize acceptable re-		۲.	
•	_	frigeration facilities ,	2.76	61	Recognize hazardous chemicals
	65	Recognize good personal	•	•	and know their uses
	l	hygiene \setminus .	å 75	110	Alidden to concrete and work
• •	5 \$ _5'	· · · · · · · · · · · · · · · · · · ·	2.75	10	Ability to cooperate and work
2,86		Dependable work habits		•	with other departments and agencies
•	57	Recognize acceptable		23	Know the possible routes of
		'single service utensils		23	contamination in each type
				0	of well
•					(- "C

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TABLE	3 V. – Go	ontinued			
	' Item		•	Item	
CNF	No.	Item Description	CNF	No.	Item Description
2.74	138	Recognize cross connections	2.64	205	.' Know accepted safegards
	· - '	between water and sewage systems		•	for various poisons
	163 .	Ability to take legal	2.63	28	Know and have the ability
		swimming pool water sam- ples	•	•	to apply standards to privies
				146	Know the mode of trans-
2.73	22	Ability to inspect and			mission of vector-borne
		recognize each type of well construction		-178	diseases · Know bacterial and chemical
		well constitution		170	standards for both raw and
2,72	، 47	. Know the procedures in			pasteurized milk
		processing citizen-	• •		
		initiated complaints	2.62	. 128	Ability to sample chlorinated
	52	Ability to run field . tests on dishwashing	-	283.	water
		machines and sanitizing solutions	·**	20.J.,	Know proper procedures in a human rabies exposure
•	210.	•	2.61	6	Knowledge of the profes-
·	•	rodent harborages	_, _,		sional jargon of the discipline
2.71	29	Ability to accomplish	2.60	. 8	Knowledge of enforcement
•	• •	percolation tests	`	•	procedures
2.70	59	Ability to evaluate cleanliness of vending	2.59	211	Know standards for storing materials to deter rodents
• '		machines	a.Y	251	Ability to recognize danger-
			•		ous situations in industrial
2.69	15	Ability to run field			plants .
		test for disinfectant residual		252	Know good housekeeping prac-
	133	Recognize health hazards			ţices
	200	at summer camps	2.58	42	Ability to assist pet owners
•	135	Understand vector con-~			in fly, rodent, and odor
	•	trol in camps			control
	191	Ability to recognize		0.5	
	,	acceptable toilet fa-	2.57	25	Ability to interpret water
	1	cilities	•	30	supply analysis reports Know the relationship between
2.67	16	Ability to recognize	-	. 50	soil types and effluent ab-
,,	,	different types of wells	-		sorption ·
	26	Know the procedure to		153	Understand pasteurization,
		seal an abandoned well	•		sanitation, and sterilization
	· 276	Ability to recognize	• •	186	Know the significance of
•	•	mosquito breeding areas	,		coliform bacteria in pasteur-
2.65	· 7	Understand methods of	•	ı	ized milk
,	-	gathering and preserving	2.56	207	Know effective rat proofing
,	•	evidence			methods
	. 165	Understand relationship	•	. 267	Know insects of public health
<i>.</i>	,	of pH to chlorine			importance

TABLE V (Continue	ď
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TABLE	V Co	ntinued, .	• •		
	Item	`		Item	
CNF	· ou	Item Description	CNF	No. 37	Item Description Know lagoon safety requirements
~2.56	273	Know materials in which		119	Knowledge of techniques used
(Cont		flies will lay eggs			to treat water
(00111	274	Know sanitary storage	-	142	Understand and be able to
		methods of insect breed-			explain use of pesticides
		ing materials			in camps
	275	Know mosquito control		170	Ability to interpret analysis
	-	methods		,	results
•		•		194	Understand the definitions
2.55	164.	Understand algae con	-		in the State Housing Code
	•	trol		195	Know the responsibilities of .
			-		owners of dwelling
2.54	130			196	Know the responsibilities of
•		standards for semi-public			occupants of dwelling
		water and sewage systems	•	208	Know diseases spread by ro-
	167	Know diseases usually		060	dents to man
	£.: V	associated with natural		269	Know proper use of insecti-
		bathing places		277	Understand water ponding
	173	Understand use of chlor-		211	control as a mosquito con-
	102	ine, alum and soda ash	,		trol tool
4	193	Ability to recognize agceptable bathing		287	Ability to cooperate with
		facilities	4	207	Humane Society
	293	Know how to get samples		294	Know modes of transmission
	2,5	in safe, legal manner	•		for salmonella from pets to
	296	Ability to recognize		•	human
		unclean conditions by		- %	
		sight and smell	2.46	99	Understand community-wide
•					solid waste control methods
2.53	. 51	Understand the S.N.F. stan-		152	Understand the difference
		dards relative to food .			between aerobic and anaer-
		service equipment		2.44	obic bacteria
·	•			169	Understand recirculation
2.52	38	Know lagoon maintenance ,	•	07.5	systems Know how various diseases
•		requirements		215 .	are, transmitted from rodents
	49	Know proper use of herb-		•	'to man
•	,	icides and pesticides in nuisance control		253	Understand occupational dis-
	ę · •	ndisance control			eases caused by harmful sit-
2.51	-96	Knowledge of vector con-	,	•	uations
2.55	· ·	trol		262	Know which state department
	168 -	Understand bacterial stan-			is responsible in case of an
		dards and their application		•	industrial accident
	190	Ability to recognize accept-		.271	Understand vector-borne dis- ,
•		able kitchen facilities			ease transmission
	203	Know rat proofing methods		289	Know how to handle a rabid
	209	Know house mouse control	,		animal
		methods		305	Know when air gaps are required
_	266	Know major disease spread	•		on plumbing fixtures
•	•	to man by insect	; +		
*2.49	. 32 .	Ability to design and size `			
٠.		systems to fit existing don-	- , .		· · · · · · · · · · · · · · · · · · ·
•	•	ditions	_	-411	
•			2		

TABLE V	_	Cont	inued
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INULL	v - CC	inclined .			•
	·Item	•	- , '	. Item	<u> </u>
CNF	No.	Item Description .	CNF	No.	,Item Description
2.44	9	Ability to be a court .	2.38	192	Ability to recognize accept-
•		witness	٠		able sleeping facilities
	35	Know the basis of lagoon		198	Know plumbing fixtures re-
		operation			quired in dwellings
	200	Know meaning of deter-		206	Ability to recognize Norway
•		iorated and dilapidated			Rat and Roof Rat
	225	Know where protective		212	Ability to recognize restricted
		clothing must be worn			substances by name
	258	Recognize conditions caus-		221	Know what decibel range
		ing disabilities and ac-	,	3	hearing loss starts
•		cidents		17.7	
•	279	Know naturalistic mos-	2.37	66 ;	Re able to define air pol-
	•••	quito abatement methods	,		lution
	285	Know evidence of lack of		126 🐉	Knowledge of the Zone of
	•	sanitary manure storage			Aeration
2.43	93	Know sanitary landfill	2.36	199	Know regulations relative
,		standards			to handrails on steps
•	147	Understand definitions		218	Know necessity of rat watering
		of epidemic, endemic,	•	015	points
		pandemic, sylvan and	·	245	Ability to cooperate with
•	160	urban	•		Civil Defense Department in
*	160	Know the maining of	•	200	catastrophe
		"High-free Residual	÷	282	Know legal procedure to
		Chlorine"	•		enforce local animal control
2 (1 '	272	Varantahan lan barka		. ٠	code
2.41	21/2	Know intermediate hosts	2.35	210	Understand fumigant methods
		of insects of public	2.33	219	onderstand rumrgant methods
6	295	health importance Know the route of infec-	2 34	13/-	Vnov how to called the
1	293	tion transmission in	2.34	134 \	Know how to calculate the volume of water required
*		nursing homes			per person
		ndising names .		136	Understand electrical, sewage,
2 40	31	Ability to read conitory	•	130 .	and water hookups in public
2,40	Ji	Ability to read sanitary plot maps and simple	•		campsites
			٠,	188 ,	Know farm storage milk tem-
	114	blueprints Very the level of decibels		100 }	perature requirements
	114	Know the level of decibels			perdudre requirements.
•		that causes come per- manent hearing loss	2.33	197	Ability to recognize adequate
	117	Know the functions of a	2.33	٠,	heating facilities
	111	reservoir	•	228	Know "adequate toilet facilities"
	123	Ability to do, a sanitary	` -	• .	for number of employees
	12.5	survey of water supply		250 .	Ability to run carbon monox-
	132	Ability to apply sanitary		-50	ide field test
•	2.0,2	standards to migratory	,	260	Know which agents may cause
	•	labor camps.	× /		respiratory disease
ı	. 145	Know the reservoir of			s s s s s s s s s s s s s s s s s s s
		communicable disease	2.32	50	Ability to recognize all
		endemic to the area			stages of life cycles of
	172	Know requirements of	•	•	disease vectors
,		safety equipment	• *	•	· · · · · · · · · · · · · · · · · · ·
	181	Ability to take legal	. •		· 1
	en.	~ · ·	•	\$.	
V	41.	milk samples 53		•	•
0		, 55	٠.	. ' '	• •

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			*		, · · · · · · · · · · · · · · · · · · ·
TABLE	V - Co	ntinued •	,		**
	Itém		•	Item	•
CNF	No.	Item Description	CNF	No.	Item Description
2.31	98 .	Know refuse control mea-		297	Know illumination standards
١	1 1	sure at camps and transient		001	for institutional kitchens
	1	lodging facilities		304	Know proper handling methods
. 42	185	Understand relationship		306	of soiled mops Know sanitary methods of
- 1		of cow herd health and human disease transmission		300	disposal of dressings and
	202	Know toxic paint and toxic	•		laboratory cultures
	, 202	preservative materials			, and a second s
•	226	Know when safety equip-	2.26	141	Understand fire regulations
		ment must be readily			and standards
, (•	available		144	Recognize type and applica-
	229 ′	Know where eating and			tion of fire extinguishers
		smoking areas are located	•	151	Understand reproduction and
		in a plant	_		physiology of bacteria
	257	Recognize agents causing .	•	162 .	Know cause of mud ball in
		disabilities	4	.166	filters . 3
. ~	259	Know what safety devices		·166	Know recommended depth of diving area to height of
		are needed in a given situation	, ,	•	diving board
	261	Know which agents may		235	Understand radiation exposure
•	201	affect the skin	~~		ondolocana landadana l
	268 ·	Know life cycles of in-	2,25	84	Knowledge of acceptable
	200	sects of public health			roads within the landfill
		importance		97	Knowledge of sanitation at
	299	Know proper use of pes-	<i>,</i> ,	•	a transfer station
	٠.	ticides in all types of		100	Understand définition of
		institutions		100	noise as compared to sound, Ability to define decibels
0.00	01	The James to and I de la martin		102	Ability to deline decibers
2.29	. 81	Understand air pollution warnings, alerts and	2.24	- 21	Understand spring development
•		emergencies	4.44	21	as a domestic water source
	137	Ability to recognize ad-		44	Know areas of a community
		equate laundry facilities	•	0	which exclude specific
	,	in migrant labor camps		•	classes of animals by zoning
				116	Ability to take legal water
2.28	72	Name the six pollutants ·			samples
	• •	specified in the Clean	, ,	71	
	,	Air Act	2.23	71	Name five major sources of .
	150	Understand the trans-	•	74	air pollution Know three respiratory dis-
•	, , 159	mission of zoonosis Know the term "Thermal		. /4	eases that tend to be ag-
	1,7,	Death Time"		بر	gravated by air pollution
•	201	Know window and skylight	_	148	Understand the relationship
i 6		and/or artificial light	,		between wild animal popula-
•		required		,	tion and rabies
•	214:	Know tracking powders	•	149	Understand dog and cat con-
	•	and how to use them	~	•	trol ordinances used in
	222	Know the definition of.		100	human rabies cases
		noise		189	Know required contact times
•		• • •			and strengths of various disinfectants
•			•		distince canes

TABL	.F.	٧	_	Con	ti	Lnu	ıed

TABLE V -	- Continued	•		· . ·	٠, د
. •	tem No. Item Desci	ription	CNF	Item No:	Item Description
- 2.23 20 (Cont [†] d)	04 Know density ar requirements ,	nd space	2.20	73	Know the local ambient air quality standards for each
21	13 Ability to esti			101	of the six pollutants Understand undesirable
, , 21	of rodent popul	•			hearing changes as result of noise levels
. 22	rodent signs Understand occu causes of heari			111 127	Understand noise abatement methods
. 22	Know relationsh tween duration	nip be-	•	127	Understand quality control methods in water treatment plants
* .	exposure and de) .	140	Know space requirements for outdoor campsites
25	Understand pazacontinuous X-raposure		. ^	143 '	Ability to recognize fire safety hazards in motels and hotels
. 24				184	Understand mastitis control
25	54 Understand phys distress due to	iological	2.18	48	Ability to recognize nox-
2 5	in industrial a 55 Understand abno due to improper	rmal stress	•	217 256	Know how to mix rodent baits Ability to work with plant safety officer
26	ods Have completed		^	263	Ability to evaluate an in- dustrial hygiene problem
. 28	~	irements		270	Know how to calculate ppm and mix insecticides
. 20	for restriction bers of animals	•		278	Know the flight range of various mosquitos
, \ 30)7 Know cleaning π refuse chutes a waiters		,	309	Understand soiled laundry handling problems in institutions
30			2.17	110	Understand noise prevention
	fection control ing homes and h			113	methods v Know acceptable standards of
2.22 6	69. Know what a tem inversion is	perature	>	120 `	noise levels for homes and industry Knowledge of the Floatation
•	Knowledge of so Know ratio of p			129	Process Knowledge of State Urban
	fixtures-to-pop of day camps			* e e	Water Supply and Sewerage Systems Act
2.21 30	6 Know acceptable of cleaning and			155 156	Knowledge of active and passive immunity `Know the general effects of
A .	ing different k			187	light on bacteria Know the significance of
30		ake and		_	phosphatase in pasteurized milk
•		•			



TABLE	·V - Cò	ntinued	•		•
	Item	•		Item	
CNF	No.	Item Description	CNF	No.	Item Description
2.15	238	Know the significance of		121	Knowledge of the Continuous
	220	alpha, beta, and gamma		• .	Regeneration Process
		exposure		177	Ability to check time and
	· 241	Know who is responsible for		1,,	temperature on both HTST
		disposal of radioactive	,		and Batch Pasteurizers
		waste			and battm rastedrizers
	247	Understand "half life" of	2.10	232	Know significance of oral,
	247		2.10	232	dermal, and inhalation
1	249	Understand use of pro-	•		exposure
-		tective clothing and	, .	233	Know what protective cloth-
•	1 2 7 7		•	, 233	ing is required in dusty
	% 001	'devices			conditions
· · ·	~ 281	Know wild host animal of		246	Understand the term: Electron
	002	zoonosis in your area	E	240	
	292	Know epidemiological	-	280	Proton, Neutron Know zoonosis indigenous to
	• • • • • • • • • • • • • • • • • • • •	procedures for zoonosis	, ,	200	wild life of your area
	7.5	D -11. As 45		ാറ്റ	Khow water volume per bed and
2.14.	, 75	Be able to name three	•	298	
,		air pollution control			temperature standards for
	7 .	devices		•	nursing homes
•	78	Know the various means	2 00	100	Knowledge of value of sound
	, ·	used to monitor air	2.09	T08	muffs
		pollution		,	mulis ' .
• • •	106	Know what an ondimeter	2 00	227	
- '*	- 00	is	2.08	' 221	Understand relationship
•	109	Know principal sources			between accident rate and
	, , , , ,	of community noises		006	housekeeping
•	115	Know the potential ways		236	Ability to use dosimeter
	_	for increasing the usable		0.40	and Gieger counter
•		water supply		240	Know acceptable disposal
•	131	Understand standards of		0.00	sites
. ,		floor space and cubic air	,	243	Have ability to monitor rad-
		space for occupancy	•	000	iation from X-ray machine
			•	288,	Know sanitary requirements
2.13	220	Know where IOSHA Laws	-	,	for stockyards
•		apply and where local	·n'06	• •	, , , , , , , , , , , , , , , , , , ,
		department has respons-	2.06	11	Ability to calculate volumes
	,	ibility			of water required at an
	.230	Know what "threshold		10	installation
		limit values" are for		12	Ability to calculate peak
		toxic chemicals		06	load of a water system
	242	Know effect of radiation		36	Ability to size lagoons to
.*	· 6.5	on living tissue		157	a given system
	265	Understand use of keys		157	Knowledge of intestinal
		in insect identification	•	150	nematodes
		7		158	Knowledge of Cestodes and
2.11	79,	Know several deleterious		17/	Trematodes
•		effects of air pollution	•	174	Be able to calculate and
		other than health effects	•		maneuver bathing load

TARIE	V - C	ontinued		-	
IMPLE		neinded .	,	_	
	Item			Item	
CNF	No.	Item Description •	CNF	No.	Item Description
.2.05	122	Knowledge of removing fluorides from water	1.95	231	Understand metric system of measurements
	234	Know how to run field		301,	Know-methods of disin-
		tests for atmospheric	,	3021	fecting operating rooms
	,	contamination	•	,,	receing operating rooms
, j	286	Understand acceptable	1.94	68	Know what the adiabatic
,		animal feed storage	2.74	00	lapse rate is
•	300	Know and apply occupancy		80	Understand the relationship
	,	standards to all types			between air pollutants and
		of insititutions '			allergies
		,		89	Ability to calculate volumes
2.03	175	Know how to check a	,	0,	of refuse and cover material
	•	leak protector valve	•	103	Ability to define frequencies
	,	•			in cycles per second
2.02	5 5	Ability to size kitchen	•	154	Knowledge of the Fluores-
,	5	ventilation systems		•	cent Antibody Test
•				161	Ability to read and evaluate
2.00	.70	Know the effects of			a flow diagram
		meteorology and top-	•	179 *	Understand use of vacuum
		ography on air pollu-	•	• ,	chamber in odor and taste
		tion	,		control
	.77	Know the Ringelmann'			
		System of defining visi-	1.92	19	Know how to run a "yield and
		ble air pollutants			drawdown ^N test \ , .
	104 .	• • •	•		
	*	level of noise	1.91	118	Know how to study the flood
	112	Understand application of			characteristics of a stream
1		sound proofing buildings		125	Ability to define "potable ,
	104	and offices	•		water"
,	183	Know the differential in		182	Understand application of the
•	,	pressure of raw and pas			"holding tube". \
		teurized milk in HTST	1 00	227	Tr. 1
	244	units :	1.90	237	Understand isotopic forms
	244	Know fission from fusion	•		of elements
1.98	13	Ability to size systems	1.89	76	Be able to discuss the syner-
1.70	- 5	to meet load requirements	1.00	, ,	gistic effect of particulate
	· 58	Ability to evaluate loca-		•	and sulfur dioxide
		tion of vending machines	(1		and Surfur dioxide
		and the second of the second o	1.86	176	Know how to operate a HTST
1.97 -	. 67	Know the primary gaseous			flow diversion valve
	-	components in the atmos-	_	,	
		phere	1.85	291 -	Know psittacosis control
Y	107	Knowledge of acoustical			procedures
•		or sound-absorbing walls	•	•	
	290	Know T.B. and brucellosis	1.74	92	Estimate net weight or volume
		control methods in dairy		<u></u>	of loads
•	•	cattle		95.	Knowledge of Volume Reductions
,		والمعالم والمرابط والموارا والمالية والمتالية والمتالية والمتالية والمتالية والمتالية والمتالية والمتالية والم			Systems
		′ ′ ,	*		

TABLE	V - Co	ntInued	•		•
	Item	•	,	Item	
ĆNF	No.	Item Description	CNF	No.	Item Description
1.69	. 88	Ability to evaluate com-	1.46	45	Ability to recognize sex of animals and fowl
,	180	Know how to calculate logarithmic average of bacterial counts		90 . *	Ability to route pickup crews
			1.40	83 -	Ability to operate
,1.68	94	Knowledge of a Systems Analysis Concept	ζ.	•	landfill equipment
			1:34	46	Ability to estimate
1.66	105	Knowledge of frequency of noise	•	91	approximate age of fowl Know maintenance proce-
					dures on equipment

The professional sanitarians in Iowa scored 26 items in a category above a CNF of 2.79 in importance. They indicated that 36 items in the survey were of little importance. These 36 items were rated a CNF of below 2.00. The least important as indicated by this sub-group are: Knowledge of sanitary landfill equipment maintenance procedures (#91), ability to estimate the age of fowl (#46), have the ability to operate landfill equipment (#83), ability to route refuse pickup crews (#90), ability to recognize the sex of animals and fowl (#45), plus 26 others. This is 10% of the questions on the survey instruments the Iowa sanitarians placed in a very low category of desirability.

The resultant data received from Nebraska health administrators is presented in Table VI as follows. A total of 46 questionnaires were received from the health administrators in Nebraska.

TABLE VI

COMPETENCY NEED FACTORS IN DESCENDING ORDER OF IMPORTANCE BY NEBRASKA HEALTH ADMINISTRATORS

	Item	,		Item	• ,
CNF	No.	Item Description	CNF	No.	Item Description,
2.95	43	Ability to differentiate		252	Know good housekeeping
		between sanitary and			practices
•		unsanitary conditions		285	Know evidence of lack of
		•	•		"sanitary manure stórage
2.92	2 6 9.	Know proper use of	.5	296	Ability to recognize un-
•		insecticides		-	clean conditions by sight
	\sim				and smell
2.90	. 4	Good personal hygiene	•	•	,
	•		2.76	2	Ability with public rela-
2.85	210	Ability to recognize		_	tions and with public
. *		rodent harborages		5	Dependable work habits
	211	Know standards for stor-		14	Ability to recognize need
•		ing materials to deter	,	, 14	of disinfection
	•	rodents	€ *	23	Know the possible routes
	267	Know insects of public		23	of contamination in each
	207	health importance			type of well
		nearth importance /		,40	Know the public health
2.83	116	Ability to take legal		,40	hazards of waste disposal
2.05	110	water samples			
,	150	Ability to sample chlor-		·41	>>eystem failure
, *	120 .	inated water		41	Ability to recognize pub-
	162	Ability to take legal '	:		lic health aspects of a
				E (nuisance
, (·	swimming pool water		56	Understand sanitization of
, -	171	samples (•	: = 7!	multi-use utensils
	171	Ability to run field tests	•	5 <i>7</i> '	Recognize acceptable single
		for chlorine and pH			service utensils
.n. 01	. (5	. D		60	Understand control of pests
2.81	. 65	Recognize good personal			in food service establish-
	1, 1	hygiene			ments
	•		^ =c	1071	
2.80	. 1	Knowledge of codes, laws,	2.75	87	Know proper compaction and
,		rules and regulations per-	٠,		cover procedures
	0.1	taining to work		· 93	Know sanitary landfill stan-
·	24	Ability to sample water	1	. 28	dards
	t	supplies	•	9 6	Knowledge of vector control
, , , , ,			3	124	Knowledge of the types of
2.77	203	Know rat proofing methods		•	chemicals used for emergency
		Know accepted safeguards			chlorination
•		for various poisons	,	133	Recognize health hazards at
, 2,	207	Know effective rat proof-			summer camps
		ing methods		172	Know requirements of safety
	209	Know house mouse control			equipment '
4	,	methods '	r		







IADLE	AT - C	oncinded .	•		•
	Item	•		Item	
CNF	No.	: Item Description .	CNF	. No.	Item Description
2.71	16	Ability to recognize	2.62	7	Understand methods of
2.71	10	different types of wells	2.02	•	gathering and preserving
	. 27		_		eyidence
,	' 21	Know the public health	•	17	Ability to recognize cross
		hazards of a contaminated.		17	
		system	,	00	connections
	64	Recognize safe and unsafe	,	. 22	Ability to inspect and
٤		food handling procedures	* .		recognize each type of well
			•		construction '
2.69	191	Ability to recognize accept-		42	Ability to assist pet owners
		Table toilet facilities		6	in fly, rodent, and odor
	217	Know how to mix rodent	÷ •	,	control
		baits		54	Ability to recognize cross
	226	Know when safety equip-	•		connections in plumbing
	_	ment must be readily	•	262	Know which state department
	-	available		•	is responsible in case of
	273	Know materials in which			an industrial accident
•		flies will lay eggs	٠,٠	266	Know major disease spread
	289	Know how to handle a			to man by insect
	207	rabid animal		274,	Know sanitary storage meth-
	293	Know how to get samples	• 1	Ŧ''	ods of insect breeding mate-
•	275	in safe, legal manner	\sim		rials
		in sale, legal mannel		276	Ability to recognize mos-
2.67	98 .	Vnor rofuso control mon-		. 270;,	quito breeding areas
2.07	70	Know refuse control mea-		283	-
		sure at camps and trans-		203	Know proper procedures in
		ient lodging facilities		s	a human rabies exposure 😲
•	146	Know the mode of trans-	0 (1	3	· · · · · · · · · · · · · · · · · · ·
•		mission of vector-borne	2.61	TA0 ⁷	Ability to recognize accept-
		diseases		_	able kitchen facilities
_	162	Know cause of mud ball in		,	
		filters	2.59	230.	Know what "threshold limit
	173	Understand use of chlorine,			values" are for toxic chem-
•	,	alum and soda ash			içals , 😽
		•		، س ر	
2.66	3	Ability to write meaningful	2.58	85°	Know how to control blow
4 4, 44.	•	and intelligent reports	,	•	paper
`	´ 34 ``	Know the basis of lagoon		99	Understand community-wide
,		operation ·			solid waste control methods
	47	Know the procedures in pro-		125	Ability to define "potable
	_	cessing citizen-initiated			water"
		complaints	,	135 °	Understand vector control *
	53 🐣	Ability to inspect eating			in camps
		and drinking establish-	p ^c	138	Recognize cross connections
,	•	ments under applicable			between water and sewage
		codes			systems
٠.		·		140	Know space requirements for
2.65	10	Ability to cooperate and	•	740	outdoor campsites
2.03	TO			`142	Understand and be able to
		work with other departments	:	142	
	•	and agencies .			explain use of pesticides
		,	ċ		in camps





TIME!	1.2	One interest			
	Item	•	•	Item	· ·
CNF	No.	Item Description .	CNF	No.	Item Description
CHT	140.	item bescription .	CNP	NO.	ttem bescription
2 60	100	*	0 51	,,	•
2.58	186	Know the significance of	2.51	44	Know areas of a community .
•	-•	coliform bacteria in pas-			which exclude specific
		teurized milk	•		classes of animals by
		•		•	zoning
2.57	18	Know the sanitary pre-			
		cautions for each type	2.50	٠119	Knowledge of techniques
	•	of well	,		used to treat water .
	55 .	Ability to size kitchen	•	143	Ability to recognize fire
		ventilation systems	, , ·	143	safety hazards in motels
•	59				
	29	Ability to evaluate clean-		7 / 5	and hotels
		liness of vending machines		145	Know the reservoir of com-
	62	Understand the control			municable disease endemic
_		of pathogenic organisms			to the area
•	•	in food service establish		160	Know the meaning of "High-
	,	ments -	-		free Residual Chlorine"
	63	Recognize acceptable re-		182	Understand application of
ŕ	,	frigeration facilities			the "holding tube"
					, , , , , , , , , , , , , , , , , , , ,
2.54	192	Ability to recognize	2.48	49	Know proper use of herbicides
2.54	1,72	acceptable sleeping	2.40	77	
				-	and pesticides in nuisance
		facilities			control
	193	Ability to recognize			
-	•	acceptable bathing	2.46	220	Know where IOSHA Laws apply
•		facilities		,	and where local department
	218	Know necessity of rat		,	has responsibility
•	•	watering points	•	225	Know where protective cloth-
	224	Know relationship be-		1	ing must be worn
		tween duration of noise	•	233	Know what protective clothing
		exposure and decibel			is required in dusty condi-
	•	level	٠.	^	tions
	228	Know "adequate toilet		249	Understand use of protective
	220	facilities" for number	•	447	
			,	268	clothing and devices .
	275	of employees		200	Know life cycles of insects
•	2/2	Know intermediate hosts of	•	, 0.70	of public health importance
.•		insects of public health	_	279	Know naturalistic mosquito
•		importance	١.		abatement methods
	275	Know mosquito control meth-		284 🗽	Know local requirements for
•		ods		,	restrictions of numbers of
	× 299	Know proper use of pesti-			'animals . '
,	_	cides in all types of in-		286	Understand acceptable animal
,		stitutions	9		feed storage
•	306	Know sanitary methods of		294	Know modes of transmission for
	50%	disposal of dressings and		-,.	salmonella from pets to human
		laboratory cultures		295	Know the route of infection
. :	•	laboratory curtures		275	
2 52	1 5	Abdidow by mum finish to		304	transmission in nursing homes
2.52	. 15	Ability to run field test	•	JU4	Know proper handling methods
	2.2	for disinfectant residual	•	1005	of soiled mops
•	. 33	Ability to inspect exist-		305	Know when air gaps are required
		ingesystems		<u>.</u>	on plumbing fixtures ,
•	39	Ability to recognize system		307	Know cleaning methods of re-
	•	failure		•	fuse chutes and dumbwaiters
•	61	Récognize hazardous chemi-			
		cals and know their uses			•
					•



TABLE	VI - C	continued ,		•	A Commence of the Commence of
	Item			Item	• •
CNF	No.	. Item Description	CNF	No.	Item Description
CIVI			•		
2.43	. 8	Knowledge of enforcement	•	214	Know tracking powders and
2.43	` 0	procedures			how to use them .
	· 9	•		222	Know the definition of
	9	Ability to be a court		~~~	noise
	20	witness	•	229	Know where eating and smoking
	20	Know how to disinfect a	•	227	areas are located in a plant
		water source and system	4	2/5	Ability to cooperate with
`		•		245	
. 2.42	71	Name five major sources	•		Civil Defense Department in
		of air pollution	•	0/0	catastrophe
-	78 ⁻	Know the various means		248	Know what to do in case of a radioactive spill
٠, ,	<u>-</u> _	used to monitor air pol-		1	
*	•	lution	• •	251	Ability to recognize danger-
•	81 .				ous situations in industrial
		warnings, alerts and em-			plants
		ergencies .	• ,	256 ·	Ability to work with plant
	97	Knowledge of sanitation at			safety officer
		a transfer station			
	110	Understand noise prevention	2.35	51	Understand the S.N.F. stan-
		methods			dards relative to food ser-
	123	Ability to do a sanitary			vice equipment
		survey of water supply			*,
	144	Recognize type and applica-	2.34	6	Knowledge of the professional
	_,,	tion of fire extinguishers			jargon of the discipline
•	~ 1 49	Understand dog and cat		28	Know and have the ability to
	147	control ordinances used in		r	apply standards to privies
		human rabies cases	,	35	Know the basis of lagoon
	16 4	Understand algae control		.,	operation
	175	Know how to check a leak	•	52	Ability to run field tests
•	1/3		<i>y</i> ` .•	J4,	on dishwashing machines and
•	17/	protector valve	· ' • ·	f '	sanitizing solutions
	176	Know how to operate a		66	Be able to define air pollu-
	'a = 0	HTST flow diversion valve		,00	tion
	178	Know bacterial and chemical		.74	Know three respiratory dis-
		standards for both raw and		74.	
		pasteurized milk		,	eases that tend to be aggra-
		1	• , •	82	vated by air pollution Knowledge of soils
2.38-	194	Understand the definitions			
		in the State Housing Code		100	Understand definition of noise
,	195	Know the responsibilities	•		as compared to sound
		of owners of dwelling	•	117	Know the functions of a res-
	196	Know the responsibilities	/··;		ervoir
		of occupants of dwelling	•	132	Ability to apply sanitary
	208	Know diseases spread by	•	,	standards to migratory labor
J	:	rodents to man	<i>:</i> .	- ' ()	camps
	212	Ability to recognize re-		141	Understand fire regulations
•		stricted substances by	•.		and standards
•		name	·	155	Knowledge of active and pas-
	213	Ability to estimate size			sive immunity
		of rodent population	•		***
			/ 1-747-764		•

TABLE VI -	Con	tinu	ıed
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•	Item	•••		Item	
CNF	No.	Trom Dogovintion	CNE		Than Donaminus
CIVI	MO.	Item Description	CNF	No.	Item Description.
2.34	167	Know diseases usually	2,30	206	Ald Ideas are as a second of North Ald Ideas
(Cont'			2,30	200	Ability to recognize Norway
(Cont.	٠.	associated with natural	. •		Rat and Roof Rat
*	160	bathing places	•	227	Understand relationship
	168	Understand bacterial stan-		• >	between accident rate and
*		dards and their applica-			ho use keeping
ç		tion .		•	
	169	Understand recirculation	2.28	. ,26	Know the procedure to seal
•	,	systems			an abandoned well
	170	Ability to interpret	Ç	37∙	Know lagoon safety require-
		analysis results			ments
	183	Know the differential in			e de la companya del companya de la companya del companya de la co
		pressure of raw and pas-	2,25	× 69	Know what a temperature
		teurizêd mîlk in HTST			inversion is v
	•	units	1.	75	Be able to-name three air
	•	•		٠_ ,	pollution control devices
2.31	199	Know regulations relative		113	Know acceptable standards
		to handrails on steps		110	of noise levels for homes
,	200	Know meaning of deterior-			and industry
	200	ated and dilapidated		114	
	202	•		114	Know the level of decibels
•	202	Know toxic paint and toxic	٠,		that causes come permanent
	207	preservative materials "		100	hearing loss
•	204	Know density and space	,	150	Knowledge of the Floatation
,	0.5	requirements			Process
	²¹⁵ .	Know how various diseases		, 121 .	Knowledge of the Continuous
	č	are transmitted from	•	,	Regeneration Process
•	~	rodents to man'		131	Understand standards of 🐭 🦠
	216	Ability to estimate age of			floor space and cubic air
ŧ		rodent signs		s #	. space for occupancy
	219	Understand fumigant meth-		134	Know how to calculate the
	• '	ods		,	volume of water required
	231	Understand metric system	•	3 .	per person
		of measurements ' : .		136	Understand electrical, sew-
•	232	Know significance of oral,		,,,,,	age, and water hookups in
		dermal, and inhalation ex-		•	public campsites
4	**	posure ·	•	147	Understand definitions of
	234	Know how to run field tests	• ,	• • • • • • • • • • • • • • • • • • • •	epidemic, endemic, pandemic,
	234	for atmospheric contamina-			sylvan and urban
•		tion		151	Understand reproduction and
.'	250 ⋅	Ability to run carbon mon-	, i	171	
	250 -	oxide field test	•	157	physiology of bacteria
	257.			156	Know the general effects of
	257.	Recognize agents causing		105	light on bacteria.
	258	disabilities	•	185	Understand relationship of
	230	Recognize conditions caus-			cow herd health and human
	:	ing disabilities and acci-	*	` `	disease transmission.
•	,	dents		,	k_ :
	308	Know difference in require-	2.23	, 198	Know plumbing fixtures re-
	•	ments of cross infection con	, 1 ·		quired in dwellings
* * * .	,	trol in nursing homes and	, ,	, 221	Know what decibel range
3	•	hospitals	'¥ . '	н .	hearing loss starts
, a	309	Understand spiled laundry		ີ239 ∛	Understand hazards of contin-
• 11 7		handling problems in insti-	` •	•	uous X-ray exposure
4 23		tutions	ł		

TABLE '	VI	- Co	nti	inued	l
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	Item			Item	_
CNF	, No.	Item Description	CNF	Ņо.	Item Description
2.23	` 265	Understand use of keys in		235	Understand radiation ex-
	'd)	insect identification	' ;	•	posure
·	. u) ,	211000	. •	· 236	Ability to use dosimeter
2.19	29	Ability to accomplish		AF	and Geiger counter
2,19	2)	percolation tests	•	264	Have completed Red Cross
	50	Ability to recognize all			First Aid Training
	50	stages of life cycles of		290	Know T.B. and brucellosis
		disease vectors			control methods in dairy
-	-	, azscase vedesze		•	cattle
2.17	70	Know the effects of meteor-	·	298	Know water volume per bed
2.11	, 0	ology and topography on air			and temperature standards
		pollution.	•		for nursing homes
	″ 7 2	Name the six pollutants	•	301	Know methods of disinfect-
	, -	specified in the Clean			ing operating rooms
		Air Act		303	Understand proper location
	→ 7 9	Know several deleterious			of air intake and exhaust
•		effects of air pollution		9	systems 4
	o	other than health effects		•	•
•	109	Know principal sources of	2.14	31	Ability to read sanitary
• •	107	community noises			plot maps and simple blue-
• '	1111	. Understand noise abatement		•	prints
`•		methods		38	Know lagoon maintenance
	115				requirements .
a s	110 !	for increasing the usable		•	•
* ;		water supply	2.09	25	Ability to interpret water
	.129	Knowledge of State Urban			supply analysis reports
٠, ١		Water Supply and Sewer-	ć	,	
	۲.	age Systems Act	2.08	. 77	Know the Ringelmann System
• •	• 137	'Ability to recognize ad-			of defining visible air
	. 207	equate laundry facilities			pollutants
		in migrant labor camps		86	Understand the significance
ŧ	139	Know ratio of plumbing-			and control of leachate
	3	fixtures-to-population	•	89	Ability to calculate volumes
	•	of day camps	·-		of refuse and cover material
^	148	Understand the relation-		102	Ability to define decibels
	2.0	ship between wild animal		238	Know the significance of
		population and rabies		•	alpha, beta, and gamma
•		•			· exposure
2.16	, 184	Understand mastitis		. 242	Know effect of radiation on
	•	control .			living tissue
	270	Know how to calculate	,	253	Understand occupational dis-
	,	ppm and mix insecticides	· •		eases caused by harmful sit-
va .					uations \ ,
2.15	201	Know window and skylight		259	Know what safety devices are
, *		and/or artificial light			needed in a given situation
•		required	•	261	Know which agents may effect
•	223	Understand occupational			the skin
	* .	causes of hearing loss		280	Know zoonosis indigenous to
	^ys			•	wild life of your area

•	•				
. ` •	Item			Item	
CNF	No.	.Item Description	CNF	No 🕫	Item Description
		,	•		
2`. 08 -	281	Know wild host animal	•	282 💰	Know legal procedure to
(Cont'		of zoonosis in your area	, .		enforce local animal
. (~~~	291		į ·	,	control code
	-71	procedures		2 87 ·	Ability to cooperate with
- 0		procedures		207	Humane Society
2.07	197	Ability to management of		200	•
2.07.	131	Ability to recognize ad-	,	288	Know sanitary requirements
	ě	equate heating facilities	•		for stockyards
		All 19 I have the costs are not to	,	297	Know illumination standards
2.05	48	Ability to recognize	••	200	for institutional kitchens
,		noxious weeds		300	Know and apply occupancy
	. 58	Ability to evaluate loca-			standards to all types of
	•	tion of vending machines	*		institutions,
•		*		302	Know acceptable methods of
2.00	36	Ability to size lagoons to			cleaning and disinfecting
	4	a given system			different kinds of floors
	12.7	Understand quality con-	\$	•	
		trol methods in water	1.95 -	· 30 ·	Know the relationship be-
v	, , ,	treatment plants	. ,.	•	tween soil types and
•	150	Understand the trans-	w.		effluent absorption
Ç*	4	mission of zoonosis	•	.·.'	<i>(</i>
	153	Understand pasteuriza-	1.92	67´ _Y	Know the primary gaseous
	٠,	tion, sanitation, and .	•		components in the atmos-
• .		sterilization	,	•	phere
	159	Know the term "Thermal'		68	Know what the adiabatic
		Death Time'	,	00	lapse rate is
,	161	Ability to read and eval-		73 ⊳	Know the local ambient air
,		uate a flow diagram	•	, ,	quality standards for each
	174	Be able to calculate	•••	` ,	of the six pollutants.
	114	and maneuver bathing ?	* •	84	Knowledge of acceptable
•		load		04 ,	
	179	Understand use of vacuum		. 88 ′	roads within the landfill
•	1/3	chamber in odor and taste	· · · · ,	, €	Ability to evaluate compac-
	-		· •		tion equipment
	101	control ',	, ,	92	Estimate net weight on volume
•	181	Ability to take legal	,	101	of loads
· • •	1.707	milk samples		101	Understand undesirable hear-
* /	,187	Know the significance of		٤.	ing changes as result of
	, ,	phosphatase in pasteur-	- 1		noise levels
	1.00	ized milk ' '		108	Knowledge of value of sound
	188	Know farm storage milk			muffs
, ,		temperature requirements .		126	Knowledge of the Zone of Aer-
	260	Know which agents may	, , , , , , , , , , , , , , , , , , ,	• •	ation
. • •	•	cause respirațory dis-	•	152	Understand the difference be-
	1	ease `	· •	-	tween aerobic and anaerobic
	271	Understand vector-borne	b	4	bacteria, ·
· · · · · ·		disease transmission //	•	157	Knowledge of intestinal nema-
	277	Understand water ponding .		•	todes'
,	,	control as a mosquito	,	165	Understand relationship of pH
	-	control tool			to chlorine
,	278	Know the flight range of		166 ' •	Know recommended depth of
		various mosquitos			diving area to height of
,	•	65			diving board
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			Garage Control of the

ERIC

IMPLE	AT - A	Concluded	- 1	• •	·
	Item	•		Item	· ·
CNF	No.	Item Description	CNF	No.	Item Description
,		**************************************	-		•
1.92	189°	Know required contact	1.77	244	Know fission from fusion
(Cont		times and strengths of		254	Understand physiological
(00	٠, س	various disinfectants			distress due to agents
•		Various distincectants .	, ,	**	in industrial atmosphere
1 00	21	Transferral arriance deveals		255	Understand abnormal stress
1.90	21	Understand spring devel-		233	
		opment as a domestic water	•		due to improper work meth-
	٠. 20	source		•	ods
	32	Ability to design and size		, '	- ಇ.ಕ. ಇ.ಕ್ರಾಮ್ ಪ್ರತಿಜ್ಞ
	•	systems to fit existing	1.75	80	Understand the relationship
	•	conditions .	• 0,		between air pollutants and
.7			v	•	allergies
1.85	241	Know who is responsible		90	Ability to route pickup
•	, 4	for disposal of radio-	4	•	crews , , , ,
	ŧ	active waste		103 ₃	Ability to define frequen-
-	243	Have ability to monitor		 ,	cies in cycles per second
	• • • • • • • • • • • • • • • • • • •	radiation from X-ray		107	Knowledge of acoustical or
•	•	machine-	1.	J. U -	sound-absorbing walls
	246	Understand the term:	,	180 '	Know how to calculate,
• }		Electron, Proton,	2	100	logarithmic average of
		Neutron	٠' -	•	bacterial counts
	247				pacterial counts
•	247	Understand "half hife" .	` 1 71	10 .	o rait an enlantata neak
•		of an isotope	` 1,.,71	12	Ability to calculate peak
1	263	Ability to evaluate an /			load of a water system
		industrial hygiene '		. <u> </u>	,
	•	problem	1.69	240	Know acceptable disposal
	292	Know epidemiological	•		sites
•	,	procedures for zoonosis		•	
,		<u>.</u>	1.67	13	Ability to size systems to
1.83	104	Knowledge of pressure	•		meet load requirements.
	٨	level of noise		118	Know how to study the flood
•	105	Knowledge of frequency	7	-	characteristics of a stream .
		of noise	. •	158	Knowledge of Cestodes and
١	106	Know what an ondimeter			Trematodes
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1	is			
	112	Understand application	1,61	237	Understand isotopic forms
•		of sound proofing build-	- J,	,,,,,,	of elements
,	' 9	ings and offices	/ -	,	Or Cremento
	177	Ability to check time and	/1.58	٠76	Be able to discuss the syner-
•	111,	temperature on both HTST	/1.50	. 70	gistic effect of particulate
٥		and Batch Pasteurizers			and sulfur dioxide
	•	and Batth rasteurizers	•	. n1	
- 01	11			91	Know maintenance procedures
1.81	-11	Ability to calculate ·		464	on equipment Knowledge of a Systems Analysis
	٠.	volumes of water required /	, ,	*94	Knowledge of a Systems Analysis
	•	at an installation	•	•	Concept
			(95 ·	Knowledge of Volume Reductions
1.80	19 `	Know how to run a "yield /		. L	Systems
•		and drawdown" test	•	122	Knowledge of removing fluorides
			•		from water

•	Item	•		Item	4
CNF	No.	Item Description	CNF	No.	Item Description ,
1.48	⁻ 45	Ability to recognize sex of animals and fowl	1.33	46	Ability to estimate approx- imate age of fowl
	-	· ·		83	Ability to operate landfill
1.38	-130	Understand and apply stan		,	equipment
		dards for semi-public water		154	Knowledge of the Fluorescent
	•	and sewage systems		•	Antibody Test

The Nebraska health department administrators as a survey population subgroup place 13 questionnaire items in the category of 2.80 or above. This is 4.2% of the questions asked on the questionaire. The highest CNF among these items is 2.95 - the ability to differentiate between sanitary and unsanitary conditions (#43), know proper use of pesticides (#269), good personal hygiene (#4), ability to recognize rodent harborages (#210), know standards for storage of materials to deter rodents (#211), know insects of public health importance (#267), ability to take legal water samples (#116), ability to sample chlorinated water (#128), ability to take legal swimming pool water samples (#163), ability to check water in the field for chlorine and pH (#170), recognize good personal hygiene (#65), knowledge of codes, laws, rules, and regulations pertaining to work (#1), and last, the ability to sample water supplies (#24).

The same population sub-group placed 14 items below the level of 2.00.

This is 4.5% of the questions asked. Therefore, the Nebraska sanitarians indicate that in their opinion 4.5% of the questions on the survey instruments are not applicable to the sanitarian aides job competencies.

The data from the final sub-group of the study, the professional sanitarians in the State of Nebraska, is provided in Table VII. This population sub-group returned 59 questionnaires.

TABLE VII

COMPETENCY NEED FACTORS IN DECENDING ORDER OF IMPORTANCE BY NEBRASKA SANITARIANS

		•	· ·		•
•	Item	•		Item	• •
CNF	No.	Item .	CNF	No.	Item Description
	,	- ,			· · ·
2.90	191	Ability to recognize accept		296	Ability to recognize unclean
2.70	171	able toilet facilities	•	-	conditions by sight and
	211	Know standards for stor-		5	.smell
	211	ing materials to deter		•	•
)		rodents	2.79	4	Good personal hygiene
	•	Todenes		65	Recognize good personal
2.85	·78 ·	Know the various means	•		hygiene'
•		used to monitor air	•		,
		pollution	2.78	1	Knowledge of codes, laws,
	135	Understand vector control,		-	rules and regulations per-
		in camps			taining to work
	138	Recognize cross connec-			
		tions between water and	Ż. 76	64	Recognize safe and unsafe
••		sewage systems	2,,0	•	food handling procedures.
		a a series of the series of th			100d Mandaling brocedarios
2.83	41	Ability to recognize	2:75	14	Ability to recognize need
	4	public health aspects	2.13	7.7	of disinfection
	•	of a nuisance .		60	Understand control of pests
	43	Ability to differentfate		00	in food service establish-:
		between sanitary and un-			ments ,
. 0		sanitary conditions .		68	Know what the adiabatic, lapse
			_	00	rate is
2.82	40	Know the public health	•	96	Knowledge of vector control
		hazards of waste dis-			Ability to take legal water
		posal system failure	•	116	·
2.80	125	Ability to define		120	samples Ability to sample chlorinated
2.00		"potable water"		128	
	163	Ability to take legal		101	water
	200	swimming pool water	•	184	Ability to take legal milk
		samples			samples
	190	Ability to recognize	2 72	2	. Alilian milia moletiona
•	170	acceptable kitchen	2.72	2	Ability with public relations
		facilities		_	and with public
	210	Ability to recognize		5	Dependable work habits
	210	rodent harborages		62	Understand organisms in
	218	Know necessity of rat	_		food service establishments
	210	watering points			
	. 262		2.71	20	Know how to disinfect a water
	202	Know which state depart- ment is responsible in			source and system
	•			, -	
` /		case of an industrial · accident	2.70	27	Know the public health haz-
	276				ards of a contaminated system
•	4 PU	Ability to recognize • • • mosquito breeding areas		75	Be able to name three air pol-
	293			0.0	lution control devices
,	~ 23 	Know how to get samples		93	Know sanitary landfill stan-
•	20/	in safe, legal manner Know modes of transmis-		•	dards '
	294				•
•		sion for salmonella	•		•
		from pets to human	3.		4

TABLE	VTT	_	Con	tin	ned

TABLE	ATT -	Continued .		•	
	Item	•		Item	
CNF	No.	Item Description	CNF	No.	Item Description
,			01112	,	/ Scottiputon
2.70	124	Knowledge of the types of	2.65	61	Recognize hazardous chemicals
(Cont!		chemicals used for emer-	2,500	01	and know their uses
, 21100).	α,	gency chlorination		100	• ·
. '	153 '		:	188	Know farm storage milk
	133	Understand pasteurization,			temperature requirements
	•	sanitation, and steriliza-			:
1	,	tion	2.64	18	Know the sanitary precau-
. [193	Ability to recognize accept-			tions for each type of well
.		able bathing facilities.	•	33	Ability to inspect existing
1	194	Understand the definitions			, systems
		in the State Housing Code			V.
7	205	Know accepted safeguards	2.62	7	Understand methods of gather
1		for various poisons	•		ing and preserving evidence
	225	Know where protective		47	Know the procedures in pro-
	•	clothing must be worn			cossing citizen-initiated
` * *	245	Ability to cooperate with			complaints
		Civil Defense Department		63	Recognize acceptable refrig-
		in catastrophe	<u>γ</u>	03	'eration facilities.
•	- 249	Understand use of pro-	*		eracion racrificies,
	# 277	tective clothing and	2.60	87 .	Variation and alama and an and
	,	devices	2.00	07.	Know proper compaction and
	252	•		110	cover procedures
	232	Know good housekeeping	,	119	Knowledge of techniques used
	071	practices	,	- 10	to treat water
~ · •	271	Understand vector-borne	•	149	Understand dog and cat con-
		disease transmission .	•	•	trol'ordinances used in ullet
	273	Know materials in which	' •		human rabies cases
	v	flies will lay eggs		160	Know the meaning of !!High-
	283	Know proper procedures			free Residual Chlorine"
	•	in a human rabies ex-		165	Understand relationship of
`.	,	posure			pH to chlorine
	305	Know when air gaps are	•	171	Ability to run field test for
		required on plumbing .	,		chlorine and pH
· •	,	fixtures		[,] 192	Ability to recognize accept-
•		5 mg h . 💉			able sleeping facilities.
2.68	24	Ability to sample water		197	Ability to recognize adequate
*		supplies	•		heating facilities
	53	Ability to inspect eating -		198	Know plumbing fixtures re-
	•	and drinking establish-			quired in dwellings
		ments under applicable .		·200 ⁻	Know meaning of deteriorated
		codes		.200	and dilapidated.
•	54	Ability to recognize cross.		201	Know window and skylight and/
	J7	connections in plumbing		دب	or artificial light required
	56 •	Understand sanitization	, ′	207	Know effective rat proofing
	, U	of multi-use utensils		207	•
*		or marci-ase arensits	•	220 .	methods
2 67	17	Abd liter to macanina		220	Know where IOSHA Laws apply
2.67	# T\	Ability to recognize .			and where local department
		cross connections .	-		has responsibility



IADLE		contenided		~ .	
	Item	•		Item	7
CNF	No.	Item Description	CNF	No.	Item Description
2.60	226	Know when safety equip-	2.53	16	Ability to recognize dif-
(Cont		ment must be readily avail-	,		ferent types of wells
(COII C	a)	able " "		39	Ability to recognize sys-
	227	- 1			tem failure
	227	Understand relationship	_	•	Cem laitaté
٠,		between accident rate and	2.52	10	Ability to cooperate and
•		housekeeping '	2.52	10 ,	
	236	Ability to use dosimeter			work with other depart-
٠.	_ •_	and Geiger counter			ments and agencies
	_272	Know intermediate hosts of		42	Ability to assist pet
•		insects of public health			owners in fly, rodent, and
	,	importance	1	<i>T</i> .	odor control '
	274	Know sanitary storage meth-	J		
~6		ods of insect breeding	2.50	34	Ability to recognize accept-
		materials			able installation
	275	Know mosquito control meth-		• 99 .	
,		ods .			solid waste control methods
,	• 277	Understand water ponding		110	Understand noise prevention
t		control as a mosquito			methods
		control tool		114	Know the level of decibels
	285	Know evidence of lack of			that causes some permanent
		sanitary manure storage	_	1	hearing loss
,	7	banacary manazo, bojetogo,	. ;	123	Ability to do a sanitary survey
2.58	59	Ability to evaluate			of water supply
2.50		cleanliness of vending	:	152.	Understand the difference
,	•	machines		202.	between aerobic and anaer-
~		machines			obic bacteria
0 57	٠,	Ability to imite meaning.		172	Know requirements of safety
2.57	٠, ٢	Ability to write meaning-		1/4	equipment
•		ful and intelligent re-		199	Know regulations relative to
	•	ports	• `		handrails on steps.
	23	Know the possible routes		202	
	-	of contamination in each		203	Know rat proofing methods
^ .	*	type of well		206	Ability to recognize Norway
		*		010	Rat and Roof Rat
2.55	57	Recognize acceptable		212 ,	
		single service utensils			substances by name
٠.	109	Knów principal sources of		235 ·	
•		community noises		239 _	•
<i>î.</i>	146	Know the mode of trans-		~	uous X-ray exposure
v^ .	٠,	mission of vector-borne	٠.	241	Know who is responsible for
•	•	diseases			disposal of radioactive
	164	Understand algae control .	•		waste
	173	Understand use of chlorine,		269	Know proper use of insecticides
•		alum and soda ash	•	279	Know naturalistic mosquito
٠.	186	Know the significance of a			abatement methods
		coliform bacteria in pas-	,	287 -	
	. '	teurized milk	1		Humane Society
•		•	•		

• • •			•		•
TABLE	VII - C	Continued	•		
,	Item		4	Item'	
CNF (No.	Item Description	CNF	No.	Item Description
4	· Š				
2.50	304	Know proper handling meth-	a -	177	Ability to check time and
'(Con₹	(a) 📜	ods of soiled mops .	,		temperature on both HTST
	5 3			•	and Batch Pasteurizers
2.48	51	Understand the S.N.F.	,	185	Understand relationship of
••	1 3	standards relative to			cow herd health and human
	•	food service equipment ' 🧳	-	,	disease transmission
	52	Ability to run field	٠.	187	Know the significance of
	. ,	tests on dishwashing.	-		phosphatase in pasteurized
	•	machines and sanitiz-		• 3	milk
•		ing solutions		204	Know density and space re-
32.46	22			201	quirements
2.46	22	Ability to inspect and		208	Know diseases spread by
•	•	recognize each type of	•	200	rodents to man
e • »		well construction		214	-
2,45	99	Understand community-	<i>5</i> 4	214	Know tracking powders and
-,	٠. ٠	wide solid waste con-		215	how to use them Know how various diseases
		trol methods	•	213	
	111	Understand noise abate-			are transmitted from rodents
* , `	11,6	ment methods		000	to man
	162	Know cause of mud ball	*	228	Know "adequate toilet facil-
<i>;</i> ;	. 102	in filters	-		ities" for number of employees
	169	,		229 •	Know where eating and smoking
•	109	Understand recircula-	,		areas are located in a plant .
•	100 4	tion systems	<u> </u>	232	Know significance of oral, 3
	182 😘	Understand application			dermal, and inhalation ex-
<i>'</i>	., -	of the "holding tube" .	•		posure .
2.44	26 .	Know the procedure to		238	Know the significance of alpha,
•		seal an abandoned well	•		beta, and gamma exposure
	° •		~-	246	Understand the term: Electron,
2.43	.15	Ability to run field	-		Proton, Neutron ''
. •	•	test for disinfectant		250	Ability to run carbon monox-
	•	residual			ide field test
2.40	71	Name five major sources		251	Ability to recognize danger-
7.	, ,	of air pollution	•		ous situations in industrial
	72	Name the six pollutants	1		plants
<i>)</i>	, -	specified in the Clean		265	Understand use of keys in
· / · ·	•	Air Act			insect identification
	/ 82	Knowledge of soils		266	Know major disease spread
••	85	Know how to control blow		- '	to man by insect
	*	paper -		282	Know legal procedure to enforce
	98 "	Know refuse control mea		-	local animal control code
•	<i>y</i> 0 ₅	sure at camps and tran-		. 284	Know local requirements for
				٠.	restrictions of numbers of
• •	112	sient lodging facilities			animals
	113	Know acceptable standards		286	Understand acceptable animal
	,	of hoise levels for homes	•		feed storage -
	117	and industry		288	Know sanitary requirements for
	117	Know the functions of a		200 \$	stockyards
•	1.01	reservoir		292	Know epidemiological procedures
,	121	Knowledge of the Contin-		ber I be re	for zoonosis
٠.		uous Regeneration Pro-	, "	295 *	Know the route of infection
		cess		-,,	transmission in nursing homes
•	?	•	•	297	Know illumination standards
r	1	.	•	•	for institutional kitchens
	*				

TABLE	VII		Con	tinue	d
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JABLI	•	Courtifued		•	
	Item	•	~15	Item	Item Nescription
CNF	No.	Item Description	CNF	No.	trem nescription
	202	Know acceptable methods	2.34	44	Know areas of a community
2,40 (Con			2.54	44	which exclude specific
(COII	L a).	of cleaning and disinfect-			classes of animals by
		ting different kinds of			Section 1. Control of the control of
		floors	3-		zoning
	303	Understand proper loca-	,* ,,	0.1	y lamanal/odm mollution
	(m	tion of air intake and	2.30	81	Understand air pollution
Ť		exhaust systems			warnings, alerts and emer-
	308 .	Know difference in re-	+		gencies.
		quirements of cross infec-		131	Understand standards of
	•	tion control in nursing	٠	c.	floor space and cubic air .
•	٠ ٠,	homes and hospitals .	•	,	space for occupancy
	30 9	Understand soiled laundry		139	Know ratio of plumbing-
		handling problems in insti-		•	fixtures-to-population of
	•	tutions			day camps
		, ,	مہ	145	Know the reservoir of com-
2.39	6	Knowledge of the profes-			municable disease endemic
		sional jargon of the dis-			to the area
	•	cipline	٠.	166	Know recommended depth of
					diving area to height of
2.38	8 ,	Knowledge of enforcement		-	diving board
• '	,	procedures	,	18 9	Know required contact times
ť			,	_	and strengths of various
2.36	28	Know and have the ability	•	•	disinfectants'
		to apply standards to		202	Know, toxic paint and toxic
		privies			preservative materials
	•			209	Know house mouse control
2.35	66	Be able to define air			methods
	,	pollution		221 🌤	Know what decibel range hear-
	- 74	Know three respiratory	· · · .	مر	ing loss starts
•	• •	diseases that tend to be	:	·224	Know relationship between dur-
	•	aggravated by air pollu-	r .	•	'ation of noise exposure and
	-	tion	المتمتذ	` .	decibel level.
•	77	Know the Ringelmann System:	- •	247	Understand "half life" of an
•	- 40	of defining visible air		- r	isotope
,	ı ^	pollutants	,	248	Know what to do in case of a
•	. 100	Understand definition of		3	radioactive spill
	. 100	noise as compared to	,	256	Ability to work with plant
		sound			safety officer
	130	Understand and apply stan-	• ′	258	Recognize conditions causing
	150	dards for semi-public water	• • •		disabilities and accidents
•		and sewage systems	• • •	260	Know which agents may cause
٠, ،	137-	Ability to recognize ade-			respiratory disease
	137	quate laundry facilities	- ش	268.	Know life cycles of insects of
•	• •	in migrant labor camps			public health importance
• ,	148	Understand the relation-		299	Know proper use of pesticides
	140	ship between wild animal	,		in all types of institutions
	•	population and rabies		306	Know sanitary methods of dis-
	147			. 500	posal of dressings and labor-
•	167	Know diseases usually		٠.	atory cultures
		associated with natural		307	Know cleaning methods of refuse
	•••	bathing places	÷ .	307	chutes and dumbwaiters
•	_			2 ,	CHUICA GIIG GGIIDAGIICOLO

TABLE VI	T -	Cont	inuéd
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•	'Jtem		*	Item	
CNF	No.	Item Description	CNF	No:	. Item Description . '
		, Toom Bederiperon	CIVI		tem bescription .
2.25	35	Know the basis of lagoon		100	7
	33	operation		183	Know the differential in
	70			L	pressure of raw and pas-
	70	Know the effects of meteor-			teurized milk in HTST units
		ology and topography on		21/3	Ability to estimate size of
•		air pollution			rodent population
	132	Ability to apply sanitary		217	Know how to mix rodent baits
is .		standards to magratory		222	Know the definition of noise
• •		labor camps		230	Know what "threshold limit
	142.	Understand and he able to	} .		values" are for toxic chem-
		explain use of pesticides	·, · · ·	,	icals
. •	•	in camps		231	Understand metric system of
	144	Recognize type and ap-	4		measurements
		plication of fire extin-	1676	233	Know what protective clothing
•		guishers		درد	
	147	Understand definitions .	•		is required in dusty condi-
•	-, · ·	of epidemic, endemic,	•	240	tions
	, ,	pandemic, sylvan and			Know acceptable disposal sites
•		urban	· .	~243	Have ability to monitor radi-
	. 155		į,	0.50	ation from X-ray machine
	, 255	Knowledge of active and		253	Understand occupational dis-
1.1	· • ·	passive immunity	• .		eases caused by harmful.sit-
2 25	•				uations
2.24	9	Ability to be a court		. 259	Know what safety devices are
		witness _ '		•	needed in a given situation
40:00			, ,	281	Know wild host animal of
2.22	25	Ability to interpret	,		zoonosis in your area
45	,	water supply analysis	٠.	289	Know how to handle a rabid
~		reports	•	•	animal
- 🕯 😭	, ·		•		•
. 2:21	29 -	Ability to accomplish	2.18	37 .	Know lagoon safety requirements
,		percotation tests	•		
• • •	. 38	Know lagoon maintenance	2.15 %	.31	Ability to read sanitary plot
•	1	requirements	•		maps and simple blueprints
<i>;</i> -		•		67	Know the primary gaseous
2.20	69	Know what a temperature	3		components in the atmosphere
		inversion is	•	105	Knowledge of frequency of noise
	79	'Know several deleterious'.		127	Understand quality control math
: .	•	effects of air pollu-			Understand quality control meth-
	•	tion other than health		150	ods in water treatment plants,
		effects		100	Understand the transmission of zoonosis
A See Au	101.	Understand undesirable		150	,
0.	101,	hearing changes as		159 .	Know the term "Thermal Death
•	• •				Time"
	1.40	result of noise levels		.176	Know how to operate a HTST
	7.40	Know space requirements			flow diversion valve
•	1/2	for outdoor campsites		184	Understand mastitis control
	143	Ability to recognize fire,		\$. • • •
	• •	safety hazards in motels	2.14		Know proper use of herbicides
•	4	and hotels			and pesticides in nuisance
	161	Ability to read and eval-			control.
. ,	•	uate a flow diagram	•		
	, , ,	·			. .

	•	•	•		,
	•	•			•
TABLE	VIT -	Continued	•		•
INDEL		,	×	Item	• * * • • • • • • • • • • • • • • • • •
arr.	Item	The Description	CNF	Nq.	Ttem. Description
CNF	No.	Item Description	CINE	đ.	CCCM. BOSOL IP CLOSS
2 10	115	Verse the potential roug	2.00	86	Understand the significance
2.10	115.	Know the potential ways		. 00	and control of leachate
		for increasing the usable		102	Ability to define decibels
		water supply	•	102	Ability to define frequen-
	219	Understand fumigant meth-		102	cies in cycles per second
-		ods	Ç.*	100	Know what an ondimeter is
	223	Understand occupational		106	
		causes of hearing loss		126	Knowledge of the Zone of
	237	Understand isotopic forms	•	,	Aeration
		of elements		· 133 .	Recognize health hazards at
	242	Know effect of radia-		_	summer camps
		tion on living tissue		151	Understand reproduction and
	244	Know fission from fusion		_	physiology of bacteria
	263	Ability to evaluate an		179	Understand use of vacuum
•	•	industrial hygiene prob-			chamber in odor and taste
	•	lem .			control'
	264 '	Have completed Red Cross	_	195 .	
		First Aid Training	•	. '	owners of dwelling
A	270	Know how to calculate		216	Ability to estimate age of
36	4	ppm and mix insecticides	_		rodent'signs
	278	Know the flight range of	•	257	Recognize agents causing
		'various mosquitos '		,	disabilities
•	300	Know, and apply occupancy.		267	Know insects of public health
		standards to all types	•		importance
		of institutions		280	Know zoonosis indigenous to
	4	•	-	a.	wild life of your area
2.07	21	Understand spring devel-	>		•
		opment as a domestic	1,96	50	Ability to recognize all
		.water source	•		stages of life cycles of
•	•			•	disease vectors
2.05	· 73 .	.Know the local ambient .			
	* -	air quality standards	1.95	112	Understand application of
	٠.	for each of the six		****	sound proofing buildings and
	ί,	pollutants.	. ,-		offices
	.80	Understand the relation-	ar 4	¹ 170	Ability to interpret analysis
		ship between air pollu-	, .		results
		tants and allergies	·		•
-	104-	Knowledge of pressure	1.93	19	Know how to run a "yield and
	·	level of noise	=		drawdown" test
	107	Knowledge of acoustical		32	
·	£ 0 ,	or sound-absorbing walls			systems to fit existing con-
	175	Know how to check a leak	*** ()	•	ditions
٠.	x, J	protector valve			
•		LIGHTON TANA	1 00	120	Vnovilades of the Floatation



Ability to evaluate 10cation of vending machines

Know the relationship

between soil types and

effluent absorption

58

30

2.03 .

2.02

1.90 120

136

Knowledge of the Floatation

Understand electrical, sewage, and water hookups in public

174 . Be able to calculate and man-

euver bathing load

Process

campsites

TO A TO T TO	TITT	•	0 4		- 1
TABLE	ATT	_	Cont	.ını	ıea

TABLE	ATT - T	continued	· .	• •	
	·Item	•	,	Item	•
CNF	No.	Item Description	CNF		
, ONT	110.	rem Description	CNF	Nφ.	Item Description
1.90	196	Vaca the managed didta	1 70	7.0	
		Know the responsibilities	1.70	76	Be able to discuss the
(Eont		of occupants of dwelling			synergistic effect of
	234	Know how to run field /	,		particulate and sulfur
	· .	tests for atmospheric			dioxide
9 1		contamination	•	134	Know how to calculate the
•	254	Understand physiological			volume of water required
		distress due to agents		•	per person
	-	in industrial atmos-		255	Understand abnormal stress
•	٠.	phere · · · · · · · · · · · · · · · · · ·			due to improper work methods
	291	Know psittacosis control	_		, , , , , , , , , , , , , , , , , , ,
•		procedures	1.65	88	Ability to evaluate compac-
	301	Know methods of disin-			_tion equipment
¥	•	fecting operating rooms	, –	95	Knowledge of Volume Reduc-
•				9,5	
1'.85	89	Ability to calculate	-	157	tions Systems
1.05	0)	volumes of refuse and		157	Knowledge of intestinal
		cover.material ·		100	nematodes
	118			180	Know how to calculate log-
	110	Know how to study the			arithmic average of bacterial
		flood characteristics			counts
	7.7	of a stream			: " · · · · · · · · · · · · · · · · · ·
•	141	Understand fire regula-	1.64	11.	Ability to calculate volumes
	• •	tions and standards	•	2	of water reguired at an in-
	168	, Understand bacterial ,	•	-	stallation
		standards and their			
•		application	1.62	.55	Ability to size kitchen .
		••		;** ;	ventilation systems
1.83	48	Ability to recognize			***************************************
	•	noxious weeds	1.61	13	Ability to size systems to
		- g	-		meet load requirements
1.80	108	Knowledge of value of			
		sound muffs	1.60	36	Ability to size lagoons to a
	122	.Knowledge of removing	•		given system
		fluorides from water	•	154	Knowledge of the Fluorescent
•	158	Knowledge of Cestodes	,	*	Antibody Test
	,	and Trematodes	•		Antibody lest
	261	Know which agents may	1.57	12 /	Ability to calculate peak
		effect the skin		12	load of a water system
•	290 '	Know T.B. and brucellosis		45	Ability to recognize sex of
	250	control methods in dairy	•	,43	animals and fowl
		cattle			animals and lowi
	298		1 55	00	41 17 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
	290	Know water volume per	1.55		Ability to route pickup crews
		bed and temperature			Estimate net weight on volume
		standards for nursing			of loads
		homes		94,	Knowledge of a Systems Analysis
	0.1	v. 11		*	Concept
1.75	84	Knowledge of acceptable	•	129	Knowledge of State Urban Water
1.	,	roads within the landfill	•	•	Supply and Sewerage Systems
,			•	•	Act

•

TABLE		Continued		τĹ	
CNF	Item No.	Item Description	CNF	Item No.	Item. Description
1.50	156	Know the general effects of light on bacteria	1.30	178	Know bacterial and chemical standards for both raw and pasteurized milk.
1.32	46	Ability to estimate approx- imate age of fowl	1.25	91	Ability to operate landfill equipment Know maintenance procedures on equipment
	485	•		• .	ou cdarbment (

The most important items to the Nebraska sanitarians had a CNF of 2.90. They are items: (#191) ability to recognize acceptable toilet facilities, (#211) know standards for storage of materials to deter rodents. This survey population sub-group placed 18 or 5.8% of the competencies on the survey instruments in the category above 2.80. This same survey population sub-group gave a CNF of less than 2.00 to 48 items included in the survey. This equals 15% of the 309 questions on the survey instruments.

Table VIII provides the reader with an item-by-item CNF comparison between the total Iowa and total Nebraska populations. The left column gives the item number. The second column gives the competency need factor of each item for Iowa and the third column gives the Nebraska competency need factor. The fourth column gives a brief description of the survey item.

TABLE VIII

A SURVEY ITEM COMPARISON OF COMPETENCY NEED FACTORS BETWEEN THE IOWA AND NEBRASKA RESPONDENTS

Item No.	iowa C <u>n</u> f	nébr. Cnf	Item Description
1	2.82	2.80 -	Knowledge of codes, laws, rules and regulations pertaining to work
2 -	2.83	2.78	Ability with public relations and with public.
.3.,	2.68	2.61	Ability to write meaningful and intelligent reports
4	2.83	2.84	Good personal hygiene
, 5	2.81	2.74	Dependable work habits
6	2.55	2.37	Knowledge of the professional jargon of the discipline
7,	2.63	2.62	Understand methods of gathering and preserving evidence
8 .	2.48	2.40	Knowledge of enforcement procedures
9`, [§] `	2:42	2.32	Ability to be a court witness
10	2.68	2.57	Ability to cooperate and work with other departments and agencies
,11 °	2.05	1.71	Ability to calculate volumes of water required at an installation
12	2.02	1.65	Ability to calculate peak load of a water system
	1.97	1.63	Ability to size systems to meet load requirements.
14	2.77 -	2.76	Ability to recognize need of disinfection
15.	2.64	2.47	Ability to run field test for disinfectant residual
16	2.68	2.61	Ability to recognize different types of wells
17	2.69	2.65	Ability to recognize cross connections
18	2.75	2.65	Know the sanitary precautions for each type of well .
19 :	1.96,	1.88	Know how to run a "yield and drawdown" test
20	1.96	2.59	Know how to disinfect a water source and system



į	4 .		
Item No.	IOWA CNF	NEBR.	, Item Description
21	2.10	2.00	Understand spring development as a domestic water source
22	2.66	2.53	Ability to inspect and recognize each type of well con- struction
23 .	2.75	2.65	Know the possible routes of contamination in each type of well
24	2.82	2.73	Ability to sample water supplies
2 5·	2.53	2.16	Ability to interpret water supply analisis reports
26	2.63	2.38	Know the procedure to seal an abandoned well
27	2.83	2.71	Know the public health hazards of a contaminated system
28	2.63	1.73	Know and have the ability to apply standards to privies
29	2.65	2.20	Ability to accomplish percolation tests
30	2.54	2.00	Know the relationship between soil types and effluent absorption
31	. 2.44	2 3 15	Ability to read sanitary plot maps and simple blueprints
32	2.34	1.92	Ability to design and size systems to fit existing conditions
33	2.82	2.59	Ability to inspect existing systems
34	2.85	2, 57	Ability to recognize acceptable installation
, 35	2.45	2.29	Know the basis of lagoon operation
_x 36	2.07	1.63	Ability to size lagoons to a given system
37	2.41	2.22	Know lagoon safety requirements
38	2.48	2.18	Know lagoon maintenance requirements
39	2.79	2.53	Ability to recognize system failure
40	2.85 .	2.84	Know the public health hazards of waste disposal system failure
4 I	2.81.	2.80	Ability to recognize public health aspects of a nuisance
. 42	2.54	⁄ 2.56 ,	Ability to assist pet owners in fly, rodent, and odor control
43	2.88	2.88	Ability to differentiate between sanitary and unsanitary
			conditions . 73

Item No.	IOWA CNF.	NEBR.	Item Description
•			
44	2.24	2\32	Know areas of a community which exclude specific classes of animals by zoning
45	1.57	1.50	Ability to recognize sex of animals and fow1
46 .	1.42	1.33	Ability to estimate approximate age of fowl
47	2.64	2.64	Know the procedures in processing citizen-initiated complaints
48	2.12	1:92	Ability to recognize noxious weeds
49	2.44	2.29	Know proper use of herbicides and pesticides in nuisance control
50	2.19	2.10	Ability to recognize all stages of life cycles of disease vectors
51	2.54	2.44	Understand the S.N.F. standards relative to food service equipment
52.	1.80 ′	2.42	Ability to run field tests on dishwashing machines and sanitizing solutions
53	2.73	2.68	Ability to inspect eating and drinking establishments under applicable codes
′54 ′.	2.63	2.66	Ability to recognize cross connections in plumbing
55	1.99	1.60	Ability to size kitchen ventilation systems
"5 ₆	2.64	2.72	Understand sanitization of multi-use utensils
57	2.67	2.64	Recognize acceptable single service utensils
58	1.63	2.04	Ability to evaluate location of vending machines
59	2.58 •	2.58	Ability to evaluate cleanliness of vending machines
, 60	2.7,3.	2.76	Understand control of pests in food service establishments
61	2.62	2.60	Recognize hazardous chemicals and know their uses
62	2.73	2.66	Understand the control of pathogenic organisms in food food service establishments
63	2.73	2.60	Recognize acceptable refrigeration facilities

٠. '	4		and the second of the second o
Item No.	IOWA GNF	NEBR. CNF	Item Description
64	2.78	*2.74	Recognize safe and unsafe food handling procedures
65 }	2.74	2.80	Recognize good personal hygiene
66 [,]	, 2.35	2.34	Be able to define air pollution
67	2.01	2.06	Know the primary gaseous components in the atmosphere
68	1.91	Ž.44	Know what the adiabatic lapse rate is
69	2,.16	2.22	Know what a temperature inversion is
70 :	2.23	2.22	Know the effects of meteorology and topography on air pollution
71	2.44	2.41	Name the five major sources of air pollution
72	2.32	2.31	Name the six pollutants specified in the Clean Air Act
73	2.25	, 2.00	Know the local ambient air quality standards for each of the six pollutants
74	2.30	2.34	Know three respiratory diseases that tend to be aggravated by air pollution
75	2.31	2.53	Be able to name three air pollution control devices
76	1.94	1.66	Be able to discuss the synergistic effect of particulate and sulfur dioxide
77	# 2.11 ₂	2.25	Know the Ringelmann System of defining visible air pollutants
78 •	2.37	2,69	Know the various means used to monitor air pollution
79	2.21	2.19	Know several deleterious effects of air pollution other than health effects
80	2.06	1.94	Understand the relationship between air pollutants and allergies
81	2.44	2.34	Understand air pollution warnings, alerts and emergencies
82	2.29	2.38	Knowledge of soils
83	1.56	1.28	Ability to operate landfill equipment

	* 1	!	
Item No.	IOWA: CNF	NEBR. CNF	Item Description
.84	2.04	1.81	Knowledge of acceptable roads within the landfill
85	2.46	2.47	Know how to control blow paper
86	2.24	2.03	Understand the significance and control of leachate
·87	2.54	2.66	Know proper compaction and cover procedures
88	1.95	1.75	Ability to evaluate compaction equipment,
89	2.07	\ 1.94	Ability to calculate volumes of refuse and cover material
90	1.64	1.63	Ability to route pickup crews
91	í.47	1.38	Know maintenance procedures on equipment
92	1.82	1.69	Estimate net weight on volume of loads
93	2.61	2.72	Know sanitary landfill standards
94	1.85	1.56	Knowledge of a Systems Analysis Concept
95	1.83	1.63	Knowledge of Volume Reductions Systems
96	2.44	2.75	Knowledge of vector control
97	2.38	2.47	Knowledge of sanitation at a transfer station
98 、	2.43	2.50	Know refuse control measure at camps and transient lodging facilities
.99	2.52	2.50	Understand community-wide solid waste control methods
100	2.36	.2.34	Understand definition of noise as compared to sound
101	2.17	¹ 2.09	Understand undesirable hearing changes as result of noise levels
102	.2.24 }	2.38	Ability to define decibels
103	1.98	1.94	Ability to define frequencies in cycles per second
104	. 2.01	2.06	Knowledge of pressure level of noise
105	2.03	2.03	Knowledge of frequency of noise
106	2.05	1.94	Know what an ondimeter is
107	2.10	1.94	Knowledge of acoustical or sound-absorbing walls

Îţem	AWOI	NEBR.	Item Description	,
No.	CNF	CNF		
/ 108	2.24	1.84	Knowledge of value of sound muffs	
i 09	2.33	2.41	Know principal sources of community noises	
. 110	2.31	2.49	Understand noise prevention methods	
111	2.29	2:36	Understand noise abatement methods	
112	2.12	1.91	Understand application of sound proofing buildings and offices ~	•
113	· 2.26	2.34	Know acceptable standards of noise levels for homes and industry	
114	2.43	2.41	Know the level of decibels that causes some permanent hearing loss	
.115	2.29	2.13 .	Know the potential ways for increasing the usable water supply	
116	2.79	2.78	Ability to take legal water samples	
117	2.43	2.38	Know the functions of a reservoir	
. 118	2.02	1.78	Know how to study the flood characteristics of a stream	
119	2.58	2.56	Knowledge of techniques used to treat water	
120	2.16	2.03	Knowledge of the Floatation Process	
121	2.16	2.34	Knowledge of the Continuous Regeneration Process	
122	2.09	. 1.72	Knowledge of removing fluorides from water	•
123	2.52	2.22	Ability to do a sanitary survey of water supply	
124	2.66	2,72	Knowledge of the types of chemicals used for emergency chlorination	
125	2.60	2.72	Ability to define "potable water" .	
126	~2.25	1.97	Knowledge of the Zone of Aération	٠,
127	2.33	2.09	Understand quality control methods in water treatment plants	
128	.2.72	2.78	Ability to sample chlorinated water	•′

Item No.	IOWA CNF	NEBR. CNF	Item Description
129	2.29	2/22	Knowledge of State Urban Water Supply and Sewerage Systems
·130	- 2.60	2.38	Understand and apply standards for semi-public water and sewage systems
131	2.35	2.28	Understand standards of floor space and cubic air space for occupancy
132	2.46	2.28	Ability to apply sanitary standards to migratory labor camps
133	2.68	2.28	Recognize health hazards at summer camps
134 >	2 . 27	2.28	Know how to calculate the volume of water required per person
135	2.56	2.75	Understand vector control in camps
136	2.46	2.03	Understand electrical, sewage, and water hookups in public campsites
137	2.35	2.28	Ability to recognize adequate laundry facilities in migrant labor camps
138	2.75	2.75.	Recognize cross connections between water and sewage systems
139	2/29	2.25	Know ratio of plumbing-fixtures-to-population of day camps
140	2 -24.	2.34	Know space requirements for outdoor campsites
141	2.38	2.03	Understand fire regulations and standards
.142	2.51	2.38	Understand and be able to explain use of pesticides in camps
143	2.39	2.47.	Ability to recognize fire safety hazards in motels and hotels
144	2.43	2:31	Recognize type and application of fire extinguishers
145	2.361	2:38	Know the reservoir of communicable disease endemic to the area. Know the mode of transmission of vector-borne diseases
147	2.37	2, 25	Understand definition of addemic, endemic, pandemic, sylvan and urban
148	2.38	2.28	Understand the relationship between wild animal population and rabies

Item	IOWA	NEBR.	
No.	CNF	CNF	Ltem Description
149·	2.48	2.53	Understand dog and cat control ordinances used in human rabies cases
``150 <i>-</i>	2.21	2.09	Understand the transmission of zoonosis
151	2.20	2.16	Understand reproduction and physiology of bacteria
152	2.39	2.28	Understand the difference between aerobic and anaerobic bacteria
153	2.57	2.44	Understand pasteurization, sanitation, and sterilization
154.	1.92	1.50	Knowledge of the Fluorescent Antibody Test
155	2.11-	2.28	Knowledge of active and passive immunity
156	2.16	1.78	Know the general effects of light on bacteria
157	2.06	1.78	Knowledge of intestinal nematodes
158	2.02	1.75	Knowledge of Cestodes and Trematodes
159	2.16	2.00	Know the term "Thermal Death Time"
160	2.55	2.56	Know the meaning of "High-free Residual Chlorine"
161	2.35	2.13	Ability to read and evaluate a flow diagram
162	2.27	2.53	Know cause of mud ball in filters
,163 ,	2.72	2.81	Ability to take legal swimming pool water samples
164	. 2.60	2.50 .	Understand algae control
·165	2.61	2.34	Understand relationship of pH to chlorine
166	2.23	2.16	Know recommended depth of diving area to height of diving board
167	2.42	2.34	Know diseases usually associated with natural bathing places
168	2.42	2.06	Understand bacterial standards and their application
169	2.39	2.40	Understand recirculation systems
170'	2,42	2, 09	Ability to interpret analysis results
, 1,71	2.67	2.69	Ability to run field tests for chlorine and pH
172	. 2.39 *,	2.59 .	Know requirements of safety equipment

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Item No.	IOWA CNF	NEBR. CNF.	Item Description
173	2.56	2.59	Understand use of chlorine, alum and soda ash
174	2.06	2.03	Be able to calculate and maneuver bathing load
· 175	2.16	2.18	Know how to check a leak protector valve
176	2.00.	2.25	Know, how to operate a HTST flow diversion valve
177	2.23	2.19	Ability to check time and temperature on both HTST and Batch Pasteurizers
178	2.40	2.13	Know bacterial and chemical standards for both raw and pasteurized milk
179	2.07	2.00	Understand use of vacuum chamber in odor and taste control
180	1.91	1.69	Know how to calculate logarithmic average of bacterial counts
181	2.50	2.47	Ability to take legal milk samples
182	2.12	2.47	Understand application of the "holding tube"
183 `	2.14	2.25	Know the differential in pressure of raw and pasteurized milk in HTST units
184.	2.15	2.16	Understand mastitis control
185	2.37	, 2.34	Understand relationship of cow herd health and human disease transmission
186 .	2.42	2.56	Know the significance of coliform bacteria in pasteurized milk
187	2:30	2.25	Know the significance of phosphatase in pasteurized milk
188	2.45	2.41	Know farm storage milk temperature requirements
189	2.37	2.16	Know required contact times and strengths of various disinfectants
190	2.58	2.70	Ability to recognize acceptable kitchen facilities
191	24.75-	2.78	Ability to recognize acceptable toilet facilities
192	2.43	2.56	Ability to recognize acceptable sleeping facilities

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Item No.	IOWA CNF	NEBR. CNF	Item Description
193	2.62.	2.61	Ability to recognize acceptable bathing facilities
194	2.57	2.52	Understand the definitions in the State Housing Code
195	2.48	2.22	Know the responsibilities of owners of dwelling
196	2.49	2.30	Know the responsibilities of occupants of dwelling
197	2.38	2.36	Ability to recognize adequate heating facilities
198	2.52	2.39	Know plumbing fixtures required in dwellings
199	2.38	2.39	Know regulations relative to handrails on steps
200	2.45	2.43	Know meaning of deteriorated and dilapidated
201	2.26	. 2.35	Know window and skylight and/or artificial light required
202	2.42	2.30	Know toxic paint and toxic preservative materials
203	2.56	2.65	Know rat proofing methods
204	2.27	2.35 •	Know density and space requirements
205	2.71	2.74	Know accepted safeguards for various poisons
206	2.20	2.39	Ability to recognize Norway Rat and Roof Rat
2Ġ7′′	2.53	2.70	Know effective rat proofing methods
208	2.45	2.39	Know diseases read by rodents to man
• 209 _	2.47	2.57 .	Know house mouse control methods
210	2.67	2.39.	Ability to recognize rodent harborages
. 211	2.58	2.78	Know standards for storing materials to deter rodents
212	2.41	2.43	Ability to recognize restricted substances by name
213	2.14	2.301	Ability to estimate size of rodent population
· 214	12.24	2.39	Know tracking powders and how to use them
215	2.38	2.35	Know how various diseases are transmitted from rodents to

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Item No.	IOWA	NEBR. CNF	Item Description
216	2:19	2.17*	Ability to estimate age of rodent signs
217	2.25	2.4,3	Know how to mix rodent baits
·2 1 8 ·	2.36	2.30	Know necessity of rat watering points
219	2.33	2.22 .	Understand fumigant methods
220	2.30	2.52	Know where IOSHA Laws apply and where local department has responsibility
221	2.25	2.26	know what decibel range hearing loss starts
222	2.25	2.30 .	Know the definition of noise
223	· 2.24 ·	2.13	Understand occupational causes of hearing loss
224	2.18	, 2.43	Know relationship between duration of noise exposure and decibel level
225	2.45 ·	2.57	'Know where protective clothing must be worn
226	2.45	2.57	Know when safety equipment must be readily available
2-27	2.13	2.43	Understand relationship between accident rate and house-keeping
228	2.38	2.48	Know "adequate toilet facilities" for number of employees
.229	2.26	2.43	Know where eating and smoking areas are located in/a plant
230-	2.26	2.30	Know what "threshold limit values" are for toxic chemicals
231	· 2.02 .	2.26	Understand metric system of measurements
232 .	2.25	2.35	Know significance of oral, dermal, and inhalation exposure
· 233	2.27	2.35	Know what protective clothing is required in dusty conditions.
234	2.05	2 . 143	Know how to run field tests for atmospheric contamination
235	2.25	2 . 3Q.	Understand radiation exposure
236	2.06	2 35	Ability to use dosimeter and Geiger counter
.237	1.84	2 04	Understand isotopic forms of elements
- 238	2.10	2.35	Know the significance of alpha, beta, and gamma exposure

Item No.	IOWA CNF	nebr'. Cnf	Item Description
.239	2.27	2.35	Understand hazards of continuous X-ray exposure
240	2.11	1.91	Know acceptable disposal sites
. 241	2.14.	2.13	Know who is responsible for disposal of radioactive waste
242	2.16-	2.09	Know effect of radiation on living tissue
243	1.97	2.00	Have ability to monitor radiation from X-ray machine
24.4	1.97	71.78	Know fission from fusion
245 ·	2.38	2.52	Ability to cooperate with Civil Defense Department in catastrophe
246	2.06	2.09	Understand the term: Electron, Proton, Neutron
247	2.02	2.04	Understand "half life" of an isotope
248	2'.30	2.13	Know what to do in case of a radioactive spill
249	2.27	2.57	Understand use of protective clothing and devices
` 250	2:34	2.35	Ability to run carbon monoxide-field test
251 [*]	2.57	2.39	Ability to recognize dangerous situations in industrial plants,
252 ·	2.51	2.74	Know good housekeeping practices
253	2.35	1.74	Understand occupational diseases caused by harmful.sit- uations
254	2.19	1.83	Understand physiological distress due to agents in industrial atmosphere
255	2.17	1.74	Understand abnormal stress due to improper work methods
256	2.7	2.35	Ability to work with plant safety officer
257	2.139	2.17	Recognize agents causing disabilities
258	2.47	2.30	Recognize conditions causing disabilities and accidents
259	. 2.36	2.13	Know what safety devices are needed in a given situation
260、	2.41	2.13	Know which agents may cause respiratory disease

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Item No.	TOWA CNF	NEBR.	Item Description
261	2.38	2.35	Know which agents may affect the skin
262	2.46	2.70	Know which state department is Tesponsible in case of an industrial accident
263	2.14	1.96	Ability to evaluate an industrial hygiene problem
264	2.37	2.13	Have completed Red Cross First Aid Training
265 •	2.10	2.30	Understand use of keys in insect identification
266	2.42	2.52	Know major disease spread to man by insect.
267	2.57	2.87	Know insects of public health importance
. 268	2.30	1.96	Know life cycles of insects of public health importance
269 🔨	2.58	2.65	Know proper use of insecticides
270	2.32	2.04	Know how to calculate ppm and mix insecticides
271	2.37	2.52	Understand vector-borne disease transmission
272	2.43	2.57	Know intermediate hosts of insects of public health importance
273	2.56	2.61	Know materials in which flies will lay eggs
274	2.56 -	2.35	Know sanitary storage methods of insect breeding materials
275	2.61	2.30	Know mosquito control methods
276		. 2.70, .	Ability to recognize mosquito breeding areas
277 ^	2 47	2.62	Understand water ponding control as a mosquito control tool
278	.2.17	2.26	Know the flight range of various mosquitos
.279	2.32	2.48	Know naturalistic mosquito abatement methods
280	2.14	2.04 .	Know zoonosis indigenous to wild life of your area
281	.2.18	.2. £ 3	Know wild host animal of zoonosis in your area
282	2.37	2.39	Know legal procedure to enforce local animal control code
283	2.60	2.65	Know proper procedures in a human rabies exposure
284	2.29-	2.43	Know local requirements for restrictions of numbers of animals

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Item No.	· IOWA CNF	- NEBR. CNF	Item Description
285	. 2.43	2.70	Know evidence of lack of sanitary manure storage
· 286	2.16	2.43	Understand acceptable animal feed storage
. 287	2.52	·2.43	Ability to cooperate with Humane Society
- 288	2.19	* 2.39	Know sanitary requirements for stockyards
289	2.55	2.48	Know how to handle a rabid animal
290	2.01	. 2.00	Know T.B. and brucellosis control methods in dairy cattle
- 291	1.92	2.00	Know psittacosis control procedures
292	2.06	2.08	Know epidemiological procedures for zoonosis
293	2.56	2.74	Know how to get samples in safe, legal manner
294	2.42	2.60	Know modes of transmission for salmonella from pets to human
295	2.42	2.43	Know the route of infection transmission in nursing homes
296	2.62	2.87	Ability to recognize unclean conditions by sight and smell
297	2.16	2.52	Knów illumination standards for institutional kitchens
298	₹2. 07	2.04	Know water volume per bed and temperature standards for nursing homes
299	2 .34	2,43	Know proper use of pesticides in all types of institutions.
300	2.06	2.26	Know and apply occupancy standards to all types of institutions
301	~ 1.96	2.04	Know methods of disinfecting operating rooms
302	2.20	2.52	Know acceptable methods of cleaning and disinfecting different kinds of floors
303	2.18	2:26	Understand proper location of air intake and exhaust systems
304	2.26	2.48	Know proper handling methods of soiled maps
305	2.27	2.57	Know when air gaps are required on plumbing fixtures
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Item No.	IOMV,	NEBR. CNF	Intem Description	
306	♣ 2.30		Know sanitary methods of disposal of dressings and	
٠.	,	• • :	laboratory cultures	<u>,</u> -
. 307	2.24	2.39	Know cleaning methods of refuse chutes and dumbwaiters	
308	2.20	2.39	Know difference in requirements of cross infection control in nursing homes and hospitals.	•
,	. **		The nutsing nomes and nospitals.	ι
30 9	2.21	2.35	Understand soiled laundry handling problems in institutions	5

The interesting facts displayed in Table VIII are the similarities in the CNF's of most items. In evaluating 38 of the items, the two states have not agreed, one state placing the CNF in the "Highly Necessary" (above 2.50) range and the other state placing the CNF in the "Desirable" (2.00-2.49) range. The ratings of 32 other items were similarly split between the "Desirable" (2.00-2.49) range and "Not Applicable" (below 2.00) range. One item (#28) which Iowa has said is "Highly Necessary" is the ability to apply sanitary standards to privies while Nebraska has indicated this is a "Not Applicable" item. While there may be many reasons for this particular difference, the writer's conclusion is that most of the Nebraska public health professionals were found in the metropolitan areas where privies are illegal while much of Iowa's population is rural where privies are legal and county sanitarians must know the standards they must meet.

CHAPTER V

SUMMARY

The principal objective of this study was to identify the competencies required of a sanitarian aide to work effectively in the field of environmental health. For purposes of this study, the job description for a sanitarian aide as stated in the <u>Dictionary of Occupational Titles</u> was used as a reference to the general duties established for the position.

In the survey of literature, the writer could find no studies which had been conducted relative to the competency needs of a sanitarian aide. The writer's search included both a study of the references in college libraries and extensive correspondence with Schools of Public Health and Environmental Science.

The survey population of the study was 250 professional environmental personnel of Iowa and Nebraska. This population was surveyed by means of three specially-constructed questionnaires which had been previously field tested. To analyze the data, the three possible survey item responses were assigned numerical values as follows: Very Necessary - 3; Desirable - 2; Not Applicable - 1. A mean was computed for each item which is designated in this study as the Competency Need Factor (CNF). Usable data were received from 417 returned, usable questionnaires. This represented a return of 55,97 percent for the total research project.

The writer has designated each survey item with a CNF of 2.50 and above as a "very necessary" competency for a sanitarian aide. A survey item with

a CNF of between 2.00 and 2.50 has been designated as a "desirable" competency.

An item with a CNF of less than 2.00 has been designated "not applicable" to the sanitarian aide's training.

The amassed data from all the respondents indicate that 85 competencies are important enough to be included in a curriculum for sanitarian aides, 196 others should be included in the curriculum, and 28 should not be included in his training program.

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APPENDIX A

TWO YEAR CURRICULUM

ENVIRONMENTAL HEALTH TECHNICIANS

TWO YEAR. CURRICULUM ENVIRONMENTAL HEALTH TECHNICIANS

A CONFERENCE REPORT

ATLANTA, GEORGIA.

MAY 2'7 AND 28, 1970

Conducted by the National Environmental Health Association under Contract No. PLC-70-5 from the Environmental Health Service, Public Health Service, Department of Health, Education and Welfare

And And

INTRODUCTION

A conference on the education and training of environmental health technicians was held by the National Environmental Health Association on May 27 and 28, 1970 in Atlanta, Georgia. The conference was attended by twenty-one people from academic institutions with two-year or four-year programs in environmental health, from agencies that employ environmental health technicians and sanitarians, and by persons experienced or knowledgeable in training and curriculum development. This conference was held because of the manpower needs in the field of environmental health. There is an increasing utilization of and need for two-year trained environmental health technicians by governmental agencies concerned with environmental control, and by industry. The community colleges developing programs for training environmental technicians need curriculum guidelines. The prediction for future manpower needs, and programs to train people to meet these needs, make the development of curriculum guidelines even more critical.

The changing nature and the increasing intensity of problems in environmental control have made it impractical and impossible for professionals to cope adequately with both technical and professional duties. For example:

job analyses indicate that many activities currently performed by the professional sanitarian could be performed by a person with less than baccalaureate level education and training. Thus, a partial solution to the manpower shortage is to train technicians who can handle a significant part of the technical aspects of the work currently being performed by professionals. The technician can be trained in approximately one-half the time at less expense than is required to prepare the entry-level professional. The technician cannot replace the professional but can be trained to carry on the technical aspects of an environmental health



control program under the supervision of a professional. This allows the professional environmentalist more time to function in areas of planning, developing, administering, evaluating and promoting environmental control programs. The salary range for the technician, when compared with that of the professional, is also appealing to an employer. The overall purpose of the environmental health technician training program is to upgrade the expertise and general technical competency of people available for employment in environmental control programs.

Environmental health technician training can most appropriately be offered by community colleges or junior colleges. Such institutions conduct training programs extending up to two years duration, which may lead to the Associate of Arts degree, or the Associate of Applied Science degree, or to similar associate degrees. Many community colleges and junior colleges are committed to technical and vocational training and currently have many other types of technician training programs, including several in the health fields. They are geared to recruit people into two year training programs and have maximum contact with students desiring this type of training. The community colleges can utilize professionals employed in the surrounding regions to assist in the technical development and implementation of the technician training program and to supplement the faculty responsible for the training program.

The charge to the conference was:

- 1. Develop a definition for the environmental health technician.
- 2. Develop a guideline for a two year curriculum for environmental health technicians.
- 3. Develop a plan for dissemination of the curriculum guidelines.

At the onset of the conference, the participants agreed on three points and then devoted a major effort to the development of curriculum guidelines.

The three points agreed upon were:

- The acceptance of the description of the environmental Héalth technician as it appears in the Position-Classification Standards, U. S. Civil Service Commission, Environmental Health Technician Series, GS 689, October, 1969.
- 72. The environmental health technician should be trained as a generalist so that he can either work across the board in a general environmental control program, or function in a number of specialized areas or activities.
- 3. The environmental Health technician should be "job ready" when he completes his two year program of study, but he should not be dead-ended. That is, he should be able to transfer into a four year environmental health curriculum with maximum transferability of credit.

The following curriculum guidelines were developed, recognizing that each institution has its own peculiar or unique requirements and goals and is limited by its resources, facilities and faculty. Contemplating such variations, the guidelines are designed to emphasize those topic areas found to be most commonly essential to the development of the "job ready" generalist in environmental health technology.



TWO YEAR ENVIRONMENTAL HEALTH TECHNICIAN PROGRAM

CURRICULUM GUIDELINES

LIBERAL ARTS AND SCIENCE CONTENT

Recommended Topics

Desirable Topics

COMMUNICATIONS:

English Composition

Report Writing

Speech

SOCIAL SCIENCES:

Sociology

Economies

Political Science Local and State government.

Psychology Interpersonal and group relationships.

SCIENCES:

Algebra

Trigonometry and Geometry.

Physical Science or Introduction to Physics

Ecology

General Chemistry

General Biology

General Microbiology with laboratory



TWO YEAR ENVIRONMENTAL HEALTH. TECHNICIAN PROGRAM

CURRICULUM GUIDELENES

TECHNICAL CONTENT

Recommended Topics

Desirable Topics

Water Quality

Industrial Hygiene

Air Quality

Noise Control r

Food Protection

Radiological Health

Vector Control

Land Use

Sollid-Wastes

Accident Prevention

Shelter

Plan Review

SURVEY COURSE--ENVIRONMENTAL HEALTH

A curriculum preparing the environmental health technician should include a course designed to cover all the recommended and desirable topics listed above. This course should be offered early in the curriculum to acquaint the student with the broad scope of the field of environmental control and how these topics relate in a comprehensive environmental health program. The course should be valuable to other students in the school because of the general interest in this basic subject area.

SURVEY COURSE-PUBLIC HEALTH OR COMMUNITY HEALTH

The student should be introduced to the broad field of public health or community health, of which environmental health is a part. The course should give definition and application of health education methodology and principles, epidemiology, communicable disease control, public health law, and public health organization and administration.

FIELD TRAINING

Field Training is an essential part of the training of a technician. The field involvement should be comprehensive and of sufficient duration to permit



through lectures, laboratory sessions, problem solving sessions, and field observations. Much of the field involvement should consist of performing activities that will be of value to the training agency and to the community.

CURRICULUM CONTENT

The liberal arts and the sciences in the curriculum should total approximately 40 percent of the two year program. The technical content of the curriculum should total approximately 40 percent of the two year program. The remaining 20 percent of the program should consist of elective courses or special college requirements. The development of a curriculum should be preceded by an analysis or survey of the employment opportunities and skill requirements of the environmental health technician within the region normally served by the institution. Such a study will identify areas of vocational competence which should be emphasized in the technical areas of the curriculum.

VARIATIONS IN CURRICULUM CONTENT

It is recognized that curricula will vary on the basis of regional needs and the organizational pattern of any particular educational institution. Variations are expected between the colleges in the courses offered, in the course titles, and in the actual course content. Fach college would be expected to offer a majority of the recommended topics in a comprehensive manner. The remainder of the recommended topics, and the desirable topics, would be incorporated into the survey course in environmental health. A program which does not offer a majority of the recommended topics in a comprehensive manner could not be considered a generalized program.

TRANSFERABILITY OF CREDITS

The courses required and recommended for the two year curriculum should be of such content and level that a majority of the hours taken in the two year



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curriculum would be transferable to a four year curriculum in environmental health of related field.

FACULTY QUALIFICATIONS

The instructors of the technical content of the curriculum should have the following minimum qualifications:

- a. Three years experience within the general field of environmental
- b. Have recognized professional standing.
- c. Possess a B.S. in environmental health or related area of study.

 The coordinator of the environmental health technician program should have the following qualifications:
 - a. Five years experience within the general field of environmental health practice.
 - b. Have recognized professional standing.
 - c. Possess a Master's degree which will enhance his competencies in environmental health or in teaching.

CURRENT AND CONTINUING NEEDS

- There is a need for task analyses of the jobs to be filled by the environmental health technician. This information will assist in the development of specific content needed in environmental health technician training programs. The environmental health technician training programs should be continually reviewed to be certain that there is not "over educating" at the community college level. Seeking to maximize the transferability of credits may endanger the primary goal of realistic preparation of the "job ready" technician.
- 2. There is a need for occasional review of the curriculum guidelines presented in this report to see that they are looking ahead and preparing the type



- and quality of environmental health technicians that are needed in the coming years.
- 3. There is a need for an effort to compliante the federal programs and funding for specialized environmental technician training programs so that the various programs complement one another and are not contradictory or damaging to other programs.
- 4. The environmental health technician will find an increasing demand for his service outside the conventional public health organizational structure.

 There is a need for a forum of the related professions and the representative employer groups to outline the common goals and objectives which should guide future curriculum development for technician training.

DISTRIBUTION OF CONFERENCE REPORT

The results of this conference will be largely wasted unless the curriculum guidelines that have been developed and the accompanying recommendations are distributed to those persons, agencies, organizations, and institutions which can utilize them and put them into effect. We recommend that this report be circulated to the following:

Federal Agencies

Bureau of Health Professions, Education and Manpower Training, Division of Allied Health Manpower, N.I.H.

Federal Water Quality Administration*

Environmental Health Service*

Dept. of Health, Education and Welfare--Office of Personnel
Office of Education--Vocational Training

Department of Labor

State Agencies

Department of Education -- All states

Department of Health#--All states



Office of Comprehensive Health Planning-All states

Professional Organizations

National Environmental Health Association, and each affiliate.

American Public Health Association

International Association of Milk, Food and Environmental Sanitarians-each affiliate.

National Society of Professional Sanitarians--and each affiliate

Conference of Local Environmental Health Administrators

American Intersociety Academy for Certification of Sanitarians

American Society for Engineering Education

Other Organizations

American Association of Junior Colleges

Association of Schools of Allied Health Professions

National Sanitation Foundation--POTEET (Programs of Training and Education in Environmental Technology)

*Succeeded by the Environmental Protection Agency

#Or newly established agencies for environmental control.

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Atlanta, Georgia May 27-28, 1970

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A-11



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Pennsylvania Department of Health
Harrisburgh, Pennsylvania

UNITED STATES CIVIL SERVICE COMMISSION

POSITION - CLASSIFICATION STANDARDS

GS-698

ENVIRONMENTAL HEALTH TECHNICIAN SERIES

GS-698

This series includes positions that involve investigating, evaluating, and providing information on sanitation practices, techniques, and methods for the purpose of identifying, preventing, and eliminating environmental health hazards. Positions in this occupation require a practical knowledge of basic environmental health concepts, principles, methods, and techniques, including survey and inspection techniques and control and eradication methods.

EXCLUSIONS

- 1. Positions that involve planning, developing, evaluating, and advising on programs concerned with the elimination and prevention of environmental health hazards. These positions are classified in the Sanitarian Series, GS-688.
- 2. Positions involving inspections or investigations for the primary purpose of enforcing compliance with public health laws and regulations pertaining to food, drug, cosmetics, or to the wholesomeness and purity of food and food products. Such positions are classified in the appropriate series of the Investigation Group, GS-1800.
- 3. Positions primarily involving grading foods or other commodities, or developing, installing, or administrating quality control programs. Such positions are classified in the appropriate series of the Commodity Quality Control, Inspection and Grading Group, GS-1900.

EXPLANATORY STATEMENT

Environmental Health aids and technicians provide technical support and assistance to the sanitarian or other Halth specialists (e.g., sanitary engineer, health physicist, health officer). They conduct surveys and implement measures to control the spread of diseases and other health hazards or conditions (e.g., food contamination, air and water pollutants, insect and rodent harborages). They take samples of such materials as water, food, and air, and perform or assist sanitarians in performing tests to determine Contamination. They explain how to repair, install, or construct sanitation facilities (e.g., water systems, sewage disposal systems, plumbing), as well as how to maintain and utilize individual facilities. They investigate public and private establishments (e.g., food markets, restaurants, dairy plants, water supplies, medical care facilities) to determine compliance with or violation of public sanitation laws and regulations. However, when the primary purpose of the position is $t\phi$ perform the latter duty, it should be allocated to the appropriate serie's in the investigation group (e.g., Public Health Inspection Series, GS-1860; Food Inspection Series, GS-1863).

At the higher levels, many of the assignments made to technicians require the same depth of analysis as sanitarian positions. They differ from sanitarian assignments in that the technician is not required to resolve problems that require the application of new methods and techniques or those that require action beyond the specific work assignment. On the

> (TS.82) October 1969

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GS-698

other hand, the knowledges and abilities required for sanitarian work may be different in kind and breadth from those required for technician work, but not necessarily different in grade level. For example, technician work may require a high level of technical or administrative qualifications applicable to specific work assignments based on a comprehensive background of practical experience, training, and skill in applying knowledge of precedents, guides, and techniques.

While all positions require a practical knowledge of basic environmental health concepts, principles, methods, and techniques, the experienced technician must have a detailed knowledge of the laws and regulations governing environmental health practices as well as what constitutes a good environmental health program in one or more of the following, or other comparable environmental health areas:

-Milk and Food

-Water Supply

-Waste

-Insect and rodent

-Shellfish

-Recreation, housing, care facilities,

or other institutions.

TITLES

The title for trainee or developmental jobs (GS-1/3) is <u>knyironmental Health</u>. Aid. Environmental health aids collect and record adequate data on existing environmental sanitation conditions and initiate corrective action on the health hazards that are fully covered by written guidelines.

The title <u>Environmental Health Technician</u> is established for all non-supervisory positions in this series (GS-4 and above). Illustrative examples of tasks performed by environmental health technicians include the following:

- Conduct investigations to determine the source of outbreaks of diseases (e.g., water supplies, contaminated food, untreated waste);
- Determine sources of, and methods to eliminate or control, insect and rodent breeding and harborage;
- İnspect and evaluate sanitary aspects of rail, sea, and air conveyances;
- Perform water quality tests on individual water supplies and disinfect community water sources and systems; and
- Prepare reports of findings and discuss recommendations with owners or representatives of public and private establishments to secure cooperation in improving sanitation practices.

Those positions which include supervisory responsibilities of such significance as to require supervisory qualifications will be identified by the adding of the prefix, Supervisory, to the basic title.

EVALUATION NOTES

This material does not include grade-level criteria. The following standards and guide may be used to evaluate environmental health aid and technician positions.

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October 1969



POSITION - CLASSIFICATION STANDARDS

·GS-698

GS-698

Positions concerned with investigative, survey, or testing activities will be evaluated by comparison with the criteria for related occupations such as:

The Biological Technician Series, GS-404, Section II,

The Medical Technician Series, GS-645, and

The Physical Science Technician Series, GS-1311.

Supervisory positions should be evaluated by reference to the Supervisory Grade-Evaluation Guide, Part I. $\boldsymbol{\cdot}$

TS 82) October 1969



APPENDIX B
SURVEY CORRESPONDENCE

IOWA WESTERN COMMUNITY COLLEGE

ROBERTD FOOL Superintendent

Administrative Offices and Council Bluffs Compus 2700 Collegs Royd Council Bluffs Town 51504 Telephone (712) 328 3831 - Cliruda Czu poz 923 Fast Wa bursten St Claruda, fowa 51032 Jeli phone (712) 542 5447

This College is conducting a research project to determine the job competency needs of a sanitarian aide. A study has revealed that further research is necessary in this area and the Iowa State Department of Public Instruction has asked Iowa Western Community College to conduct this research. It is felt that a competency needs study is required to strengthen the curriculum in environmental sanitation courses at the high school and community college level.

You have been selected as a participant in this study because of your position in the public health or environmental programs in your community. The attached survey instrument should not take more than fifteen minutes of your time. Won't you please help us?

The questions on the survey instrument relate to only four possible areas of the sanitarian aide's work. Additional questionnaires will be designed to cover other possible areas of a sanitarian aide's work assignments.

Your immediate response in the enclosed postage-free envelope is requested and gratefully acknowledged in advance.

Sincerely yours,

Harold Pengra

Project Director
IOWA WESTERN COMMUNITY COLLEGE

HP/Ilm

Enclosure

B-1

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Sanitarjan Ahle Competency Needs Survey IOWA WESTERN COMMUNITY COLLEGE

2700 Callege Road

Council Bluffs, Iowa 51501

For the purposes of this study, the term Saintarian Aide is considered to be a person with less than a Bachelor's degree who works independently in the field at a para-professional level under the direct supervision of the professional.

- Column A— In my opinion, it is highly necessary for the Samitarian Aide to possess a high degree of proficiency in the skill or attribute listed.
- Column B— In my opinion, it would be desirable for the Sanitarian Aide to possess some degree of proficiency in the skill or attribute listed.
- Column C- In my opinion, the skill or attribute listed is not applicable to the duties and responsibilities performed by a Sanitarian Aide.

- A. Highly Necessary
- B. Desirable
- C. , Not Applicable

* Check only one column for each skill or attribute listed.

	<u></u>	,				
	.6.	• .		A	В	- (;
GENER	RAL ATTRIBUTES					
1	Knowledge of codes, laws, rules & regulations pertaining to work					<u> </u>
	Ability with public relations and with public	•				
	Ability to write meaningful and intelligent reports	, ,			<u></u> _	
1	Good personal hygiene	,				
- 5	¿Dependable work habits		/	•		
	Knowledge of the professional jargon of the discipline	•		· <u>^ ^</u> ,	·	
	Understand methods of gathering and preserving evidence					
	Knowledge of enforcement procedures				,	<u> </u>
9	Ability to be a court witness					
10	Ability to cooperate and work with other departments and agenci	es		•	<u> </u>	<u> </u>
11	Ability to calculate volumes of water required at an installation		- 1		<u> </u>	.•
	Ability to calculate peak load of a water system				1	
$\frac{12}{13}$	Ability to size systems to meet foad requirements			٠ ,	- \ -	
	Ability to recognize need of disinfection	<u> </u>		•	1	
11	Ability to run field test for disinfectant residual					
16	Ability to recognize different types of wells		\rightarrow			٠.
$-\frac{10}{17}$	Ability to recognize cross connections		. 1			
18	Know the sanitary precautions for each type of well		-		, , ,	
19	Know how to run a "yield and drawdown" test	,	•	•		
20	Know how to disinfect a water source and system		•	,		
	- Understand spring development as a domestic water source	:		-		
22	Ability to inspect and recognize each type of well construction					
-23	Know the possible routes of contamination in each type of well	•			•	
21	Ability to sample water supplies	,				
25	Ability to interpret water supply analysis reports					
26	Know the procedure to seal an abandoned will			•		
27	Know the public health hazards of a contaminated system				0	
			•	•		



		Α.	ĴB ◆	C.
rí.srb	NSIBILITIES PERTAINING TO PRIVATE SEWAGE DISPOSAL SYSTEMS	i	. ,	
:28	Know and have the ability to apply standards to pairies.	,		
29	Ability to accomplish percolátion tests	· 1.		
30	Know the relationship between oil types and effluent absorption	7, 1		
	Ability to read sanitary plot maps and simple blueprints	1		
32	Ability to design and size systems to fit existing conditions		,	
33 `	Ability to inspect existing systems	1		
31	Ability to recognize acceptable installation	- \		~
35	Know the basis of layoon operation			-
36	Ability to size lagoons to a given system			
 -	Know lagoon safety requirements	4 .	-	
	Know Largon maintenance requirements			
39	Ability to recognize system failure			.,
40	Know the public health hazards of waste disposal system failure			• Σ
	Know the public hearth nazarus () waste disposal system failure	<u>l</u>		
מושינות	CODE MARC BEDTER INTO MANAGE SERVER COMMITTEE INTO			
	NSIBILITIES PERTAINING TO NUISANCE COMPLAINTS	<u> </u>	· 1 .]	,
· 11	Ability to recognize public health aspects of a nuisance. Ability to assist pet owners in fly, rodent, and odor control			
- 12 -				
13	Ability to differentiate between saintary and quantitary conditions			
11	Know areas of Acommunity which excludes specific classes of animals by zoning			
	Ability to recognize v of animals and food		,	
16	Ability to estimate approximate agr of fowl	-	,	
17.	Know the procedures in proceding eitizen-initiated complaints			
18	Mulity to recognize noxious weeds			
14	Know proper use of hethredes and pesticides in musance control		~	
50	Ability to recognize all stages of life evels of disease vectors]
	NSIBILITIES PERTAINING TO LATING AND DRINKING ESTABLISHMENTS ENDING OPERATIONS			· ·
51	Understand the S.N.F. standards relative to food service equipment			
52	Ability to run field tests on Jishwishing machines and sanitizing solutions		·	
5.1	Ability to inspect eating and drivking establishments under applicable codes		,	
71	Ability to recognize cross connections in plumbing	<u>.</u>		
55	Ability to size kitchen ventilation systems		, .	
56 \	Understand sanitization of multi-use utensils			
57	Recognize acceptable single service utensils .			
วัย	Ability to evaluate location of vending machines	,		
50	Ability to evaluate cleanliness of vending machines			
60 ,	Inderstand control of pests in food service establishments			<u> </u>
61	Recognize hazardons chemicals and know their uses	, ,		
62	Understand the control of pathogenic organisims in food service establishments]
63	Recognize acceptable refrigeration facilities]
61	Recognize safe and un-afe food handling procedures	^		
65	Recognize good personal hygiene	,]



IOWA WESTERN COMMUNITY COLLEGE

ROBERT D. LOOFT. Seperintendent

administrative Offices and Jouncil Bluffs Campus 700 College Road Jouncil Bluffs, Iowa 51501 Glephone (712) 328-3831 923 East Washington St. Clarinda, lowa 51632 Telephone (712) 542-5117

This College is continuing a research project to determine the job competency needs of a sanitarian aide. A study has revealed that further research is necessary in this area and the lowa State Department of Public Instruction has asked Iowa Western Community College to conduct this research. It is felt that a competency needs study is required to strengthen the curriculum in environmental sanitation courses at the high school and community college levels.

You have been selected as a participant in this study because of your position in the public health or environmental programs in your community. The attached survey instrument should not take more than twenty minutes of your time. Won't you please help us?

The questions on the survey instrument relate to only eight possible areas of the sanitarian aide's work. An additional questionnaire will be designed to cover other possible areas of a sanitarian aide's work assignments.

Your immediate response in the enclosed postage-free envelope is requested and gratefully acknowledged in advance.

Sincerely yours,

Harold Pengra

Project Director

IOWA WESTERN COMMUNITY COLLEGE

HP/mlo

Enclosure

Sanitarian Aide Competency Needs Survey IOWA WESTERN COMMUNITY COLLEGE 2700 College Road Council Bluffs, Iowa 51\$01

For the purposes of this study, the term Sanitarian Aide is considered to be a person with less than a Bachelor's degree who works independently in the field at a para-professional level under the direct supervision of the professional.

- Column A in my opinion, it is highly necessary for the Sanitarian Aide to possess a high degree of proficiency in the skill or attribute listed.
- Column B— In my opinion, it would be desirable for the Sanitarian Aide to possess some degree of proficiency in the skill or attribute listed.
- Column C-. In my opinion, the skill or attribute listed is not applicable to the duties and responsibilities performed by a Sanitarian Aide.

- A. Highly Necessary
- B. Desirable
- C. Not Applicable

			Α.	В	Č	
ΑI	R POLLUTION				•	
66.	Be able to define air pollution.					
67.	Know the primary gaseous components in the atmosphere.					
68.	Know what the adiabatic lapse rate is.				•	
69.	Know what a temperature inversion is.				•	
70.	Know the effects of meteorology and topography on air pollution.		•	•		١,
7Î.	Name five major sources of air pollution.			•		
$7\overline{2}$.	Name the six pollutants specified in the Clean Air Act.	_	y	,].
73.	Know the local ambient air quality standards for each of the six pollutants.					
74.	Know three respiratory diseases that tend to be aggravated by air pollution.					
• 75.	Be able to name three air pollution control devices.					
76.	Be able to discuss the synergistic effect of particulate and sulfur dioxide.		. 2.			
77.	Know the Ringelmann System of defining visible air pollutants.			,		
78.	Know the various means used to monitor air pollution.				^	١.
79.	Know several deleterious effects of air pollution other than health effects.	1.				
80.	Understand the relationship between air pollutants and allergies.					
. 81	Understand Air Pollution warnings, alerts and emergencies.					

SO	LID WASTE CONTROL .
82.	Knowledge of Soils
É 83.	Ability to operate landfill equipment.
84.	Knowledge of acceptable roads within the landfill.
85	Know how to control blow paper.
86.	Understand the significance and control of leachate.
_87.	ow proper compaction and cover procedures.
88.	Ability to evaluate compaction equipment.
. 89.	Ability to calculate volumes of refuse and cover material.
90,	Ability to route pickup crews.
91.	Know maintenance procedures on equipment.
92.	listimate net weight on volume of loads.
93.	Know sanitary landfill standards.
94.	Knowledge of a Systems Analysis Concept.
95.	Knowledge of Volume Reductions Systems.
96.	Knowledge of vector control.
97.	'Knowledge of sanitation at a transfer station.
98.	Know refuse control measure at camps and transient lodging facilities.
99.	Understand community-wide solid waste control methods

				6
) • (Α`	В	С
•				
		*		•
IND	USTRIAI. NOISE	r	,	
100.	Understand definition of noise as compared to sound.			
100. 10k.	Understand undestrable hearing changes as result of noise levels.		,	
	Ability to define decibels.			
102.	Ability to define frequencies in cycles per second.	,		ļ
103.	Knowledge of pressure level of noise		• _ •	
104.	Knowledge of frequency of noise.			
105.	Know what an ondimeter is.			٥,
106.			, ,	. 44
107.	Knowledge at acoustical or sound-absorbing walls.			
108.	Knowledge of value of sound muffs.		13	
109	Know principal sources of community noises.		-	
110.	Understand noise prevention methods.	· -		
III	Understand noise abatement methods		<i>a</i>	
112.	Understand application of sound proofing buildings and offices	1	h ———	
113.	Know acceptable standards of noise levels for homes and industry.	-		
114.	Know the level of decibels that eatises some permanent hearing loss		·	
WA:	TER POLLUTION CONTROL		c	
	Know the potential ways for increasing the usable water supply.			
115,_	Ability to take legal water samples			
116.	Know the functions of a reservior.			
117.	Know how to study the flood characteristics of a stream.		~	
_118.	Knowledge of techniques used to treat water.	,		
119,	Knowledge of the Floatation Process	•		
120.	Knowledge of the Continuous Regeneration Process.			(.
121.				7:
122.	Knowledge of removing flourides from water		1	,
123.	Ability to do a sanitary survey of water supply.		/	
124 <u>.</u>	Knowledge of the types of chemicals my de for emergency chlorination.	, —	1	· ·
125.	Ability to define "potable water"		5	
126.	Knowledge of the Zone of Aeration.	· ·	├	
127.	Understand quality control methods in water treatment plants			
128	Ability to sample chlorinated water.	<u>} </u>	 	
129.	Knowledge of State Urban Water Supply and Sowerage Systems Act.	ــــــــــــــــــــــــــــــــــــــ	1 (
	A CONTRACTOR OF THE PROPERTY O		-	
TR	ANSIENT LODGING INSPECTION	, ` ´ 	· ·	т — —
130.	Understand and apply standards for semi-public water and sewage systems	<u> </u>		 -
131.	Understand standards of floor space and cubic air space for occupancy.	<u> </u>	<u> </u>	
132.	Ability to apply sanitary standards to migratory labor camps.	ļ.——	-	
133.	Recognize health hazards at summer camps.	 	├ `	1
134.	Know how to calculate the volume of water required per person.	<u></u>	 	
135.	Understand vector control in camps		 	
136.	Understand electrical, sewage, and water hookups in public camp sites.	L		
137.	Ability to recognize adequate laundry facilities in migrant labor camps.	1	<u> </u>	<u>"</u>
138	Recognize cross connections between water and sewage systems.		ļ	ļ
139.	Know ratio of plumbing-fixtures-to-population of day camps.	!	 	
140.	Know space requirements for outdoor campsites.		L	ļ
141.	Understand fire regulations and standards.		<u> </u>	
142.	Understand and be able to explain use of pesticides in camps.	12	L	<u> </u>
143.	Ability to recognize fire safety hazards in motels and hotels.			<u> </u>
144,	Recognize type and application of fire extinguishers.		1 : -	
1.5.9	Recognize type and approach of the	•		

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				·
	, 1,			
1		Α	′ B	C.
1	COMMUNICABLE DISEASE CONTROL			*
Ì	145. Know the reservoir di communicable disease endemic to the area.			. —
l	146. Know the mode of transmission of vector-borne diseases,			- •
ł	147. Understand detentions of epidemic, endemic, pandemic, sylvan and urban.			
I	148. Understand Ahe relationship between wild animal population and rabies.	 		
ł	149. Understand log and cat control ordinances used in human rabies cases.	 		
l	150. Understand the transmissions of zoonosies			
I	151. Understand reproduction and physiology of bacteria.	-		-,
ł	152. Understand the difference between aerobic and anaerobic bacteria.	 		•
l	153.9 Understand pasteurization, sanitation, and sterilization.	<u> </u>		
l	154. Knowledge of the Houresegnt Antibody Test.	 		
١	155. Knowledge of active and passive immunity.			
I	156. Know the general effects of light on bacteria.	·		
-	157. Knowledge of intestinal nematode.	-	ļ	
1	158. Knowledge of Cestodes and Trematodes.	-		-
I	159 Know the term "Thermal Death Time &	 		•
L	107 Kindy the Color Statement Death Times	7		
	SWIMMING POOL INSPECTION			
ſ	160. Know the meaning of "High-free Residual Chlorine."	1		-
l	161. Ability to read and evaluate a flow diagram.	 		
l	.162. Know cause of fitted ball in filters.	5		
l	163. Ability to take legal swimming pool water samples.			
١	164. Understand algae control.	 . 		
l	165. Understand relationship of pH to chlorine.	;		
١	166. Know recommended depth of diving drea to height of diving board.			
l	167. Know diseases usually associated with natural bathing places.	1		~
ļ	168. Understand bacterial standards and their application.	ļ		1
I	169. Understand recirulation systems	~	•	
ŀ	170. Ability to interpret analysis results.			
Ì	171. Ability to run field tests for chlorine and pH.			3
l	172. Know requirements of safety equipment.		,	
ŀ	173. Understand use of chlorine, alum and soda ash.		,	
İ	174. Be the to calculate and maneuver bathing load.	·		
ι		3		
	MILE INSPECTION .	,		•
ſ	175. Know how to check a leak protector valve.			
١	176. Know layer to operate a HTST flow diversion valve			
ŀ	177. Ability to check time and temperature on both HTST and Batch Pasterurizers.		•	,
١	178. Know bacterial and chemical standards for both raw and pasteurized milk.			
ļ	179. Understand use of vacuum chamber in odor and taste control			
ŀ	180. Know how to calculate logarithmic average of bacterial counts,	-		
I	181. Ability to take legal milk samples,			
	182. Understand application of the "holding tube."			
١	183. Know the differential in pressure of raw and pasteurized milk in HTST units.			,
	184. Understand mastris control.			
١	185. Undstand relationship of cow herd health and human disease transmission.			
١	186. Know the significance of Cohform bacteria in pasteurized milk.			
	187. Know the significance of phosphatase in pasteurized milk.			
١	188. Know farm storage milk temperature requirements.		<u> </u>	
l	189. Know required contact times and strengths of various disinfectants			
		···		



IOWA WESTERN COMMUNITY COLLEGE

ROBERT D. LOOFT, Superintendent

Administrative Offices and Go., if Bhiffs Campus 2760 College Road Council Bluffs, Iowa 51501 Telephone (712) 328-3831 Clarinda Campus 923 East Washington St. Clarinda, Iowa, 51632 " Telephone (712) 542-5117

This college is concluding a research project to determine the job competency needs of a sanitarian aide. A study has revealed that this research is necessary and the Iowa State Department of Public Instruction has contracted with Iowa Western Community College to conduct the research. The competency needs study is required to strengthen the curriculum in environmental sanitation at the secondary and community college levels.

You have been selected as a participant in this study because of your position in the public health or environmental programs in your community. The attached survey instrument should not take more than twenty minutes of your time. Won't you please help us?

The questions on this survey instrument relate to only eight possible areas of the sanitarian aide's work. This is the final questionnaire of this project.

Your patience, cooperation, and assistance has been invaluable and I gratefully express my thanks to you.

Your immediate response in the enclosed postage-free envelope is requested.

Sincerely yours,

Harold Pengra

Project Investigator

Iowa Western Community College



Sanitarian Aides Competency Needs Survey IOWA WESTERN COMMUNITY COLLEGE 2700 College Road Council Bluffs, Iowa 51501

For the purposes of this study, the term Sanitarian Aide is considered to be a person with less than a Bachelor's degree who works independently in the field at a para-professional level under the direct supervision of the professional.

Column A-	In my opinion, it is highly necessary for the
• ,	Sanitarian Aide to possess a high degree of
•	proficiency in the skill or attribute listed.

A. Highly Necessary

Not Applicable

Column B- In my opinion, it would be desirable for the Sanitarian Aide to possess some degree of proficiency in the skill or attribute listed.

204. Know density and space requirements.

B. Desirable

C.

Column C.— In my opinion, the skill or attribute listed is not applicable to the duties and responsibilities performed by a Sanitarian Aide.

			•			
HOUSING INSPECTION				Α×	. B.	C
190: Ability to recognize acceptable kitchen facilities.			•			
191. Ability to recognize acceptable toilet-facilities.	<u> </u>					
192. Ability to recognize acceptable sleeping facilities.	•	1	_	-3,	,	•
193. Ability to recognize acceptable bathing facilities.		,			,	,
191. Understand the definitions in the State Housing Code.				1		
195. Know the responsibilites of owners of dwelling.	•					
196. Know the responsibilities of occupants of dwelling.		*				
197. Ability to recognize adequate heating facilities.	•					
198. Know plumbing fixtures required in dwellings.	age is	- ,				
199. Know regulations relative to handrails on steps.	\$15°					
200. Know meaning of deteriorated and delapidated		*				
201. Know window and skylite and/or artifical light required.	· ·					
202. Know toxic paint and toxic preservative materials.		- (
203. Know rat proofing methods.		~	ŧ			

RODENT CONTROL	•				A	В	C
205. Know accepted safe guards	for various poisons.						
206. Ability to recognize Norwa	y Rat & Roof Rat.	,					
207. Know effective rat proofin							
208. Know diseases spread by re				,	1		
209. Know housemouse control	methods.		*				
210. Ability to recognize rodent		i.					
211. Know standards for storing	materials to deter roder	nts.					
212. Ability to recognize restric	ted substances by name.		`,		`		
313. Ability to estimate size of						,	
214. Know tracking powders an	d how to use them.	• ,		•		1	
215. Know how various diseases	are transmitted from ro	dents to man					
216. Ability to a Figure age of r	odent signs.						
217. Know how to mix rodent l	aits.		· · · · ·				·
218. Know necessity of rat water	ring points.	•			-		
219. Understand furnigant meth	ods.						



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	OCCUPATIONAL SAFETY INSPECTION	A	B	C
	220 Know where IOSHA Laws apply and where local department has responsibility.		<u> </u>	
	221. Know what decible range hearing loss starts.		ļ	
	22.2 Know the definition of noise.	11	↓	<u> </u>
	223 Understand occupational causes of hearing loss.		<u> </u>	<u> </u>
	224. Know relationship between duration of noise exposure & decible level.		↓	_
	225. Knows where protective clothing must be worn.		<u> </u>	ļ
	226 Knows when safety equipment must be readly available.		 	<u> </u>
,	227. Understands relationship between accident rate and housekeeping.		↓	
,	228. Know "adequate toilet facilities" for number of employees.		↓	
٠.	229 Know where cating and smoking areas are located in a plant.		<u> </u>	
•	230 Know what "threshold limit values" are for toxic chemicals.	_	↓ _	<u> </u>
	231. Understand metric system of measurements.		<u> </u>	
	232. Know significance of oral, dermal, and inhalation exposure.		↓	<u>'</u>
	233 Know what protective clothing is required in dusty conditions.		<u> </u>	<u> </u>

232. Know significance of oral, dermal, and inhalation exposure.				Ь—	└ ──	╄
233 Know what protective clothing is required in dusty conditions.			_	!		╀
231. Know how to run field tests for atmospheric contamination.				<u> </u>	<u> </u>	┸
			• .			
	•	•				
· /				*		_
RADIOLOGICAL INSPECTION .	,	2.3		A	В	1
235. Understand radiation exposure.		146			L	ľ
236. Ability to use dosimeter and gieger counter.	10 4	¥			<u></u>	1
	24 Am		•	<u> </u>		1
	*			<u> </u>	L	1
239. Understand hazards of continuous x-ray exposure,	•					1
210 Know acceptable disposal sites.	_ ·	Ø,)		<u> </u>	1
241. Know who is responsible for disposal of radio-active waste.			•	- 4	<u> </u>	1
242 Know effect of radiation on living tissue.				Ľ_	<u> </u>	1
243. Have ability to monitor radiation from x-ray machine.				L	L	4
244. Know fission from fusion.			•	<u> </u>		1
215. Ability to cooperate with Civil Defense Department in catastrophe.				L	L	4
				1		+
	. ;		• 1	<u> ``</u>		+
248. Know what to do in case of a radio active spill.		· /	•	—	 	+
1 10 Understand use of protective clothing & devices.	, -			l		Ť
	RADIOLOGICAL INSPECTION 235. Understand radiation exposure. 236. Ability to use dosimeter and gieger counter. 237. Understand isotopic forms of elements. 238. Know the significance of alpha, beta, and gamma exposure. 239. Understand hazards of continuous x-ray exposure. 230. Know acceptable disposal sites. 241. Know who is responsible for disposal of radio-active waste. 242. Know effect of radiation on, living tissue. 243. Have ability to monitor radiation from x-ray machine. 244. Know fission from fusion. 245. Ability to cooperate with Civil Defense Department in catastrophe. 246. Understand "half life" of an isotope. 248. Know what to do in case of a radio active spill.	RADIOLOGICAL INSPECTION 235. Understand radiation exposure. 236. Ability to use dosimeter and gieger counter. 237. Understand isotopic forms of elements. 238. Know the significance of alpha, beta, and gamma exposure. 239. Understand hazards of continuous x-ray exposure. 230. Know acceptable disposal sites. 241. Know who is responsible for disposal of radio-active waste. 242. Know effect of radiation on, living tissue. 243. Have ability to monitor radiation from x-ray machine. 244. Know fission from fusion. 245. Ability to cooperate with Civil Defense Department in catastrophe. 246. Understand the term; Electron, Proton, Neutron. 247. Understand "half life" of an isotope.	RADIOLOGICAL INSPECTION 235. Understand radiation exposure. 236. Ability to use dosimeter and gieger counter. 237. Understand isotopic forms of elements. 238. Know the significance of alpha, beta, and gamma exposure. 239. Understand hazards of continuous x-ray exposure. 230. Inderstand hazards of continuous x-ray exposure. 231. Know who is responsible for disposal of radio-active waste. 241. Know who is responsible for disposal of radio-active waste. 242. Know effect of radiation on, living tissue. 243. Ifave ability to monitor radiation from x-ray machine. 244. Know fission from fusion. 245. Ability to cooperate with Civil Defense Department in catastrophe. 246. Understand the term; Electron, Proton, Neutron. 247. Understand "half life" of an isotope. 248. Know what to do in case of a radio active spill.	RADIOLOGICAL INSPECTION 235. Understand radiation exposure. 236. Ability to use dosimeter and gieger counter. 237. Understand isotopic forms of elements. 238. Know the significance of alpha, beta, and gamma exposure. 239. Understand hazards of continuous x-ray exposure. 2310. Know acceptable disposal sites. 2410. Know who is responsible for disposal of radio-active waste. 242 Know effect of radiation on, living tissue. 243. Have ability to monitor radiation from x-ray machine. 244. Know fission from fusion. 245. Ability to cooperate with Civil Defense Department in catastrophe. 246. Understand "half life" of an isotope. 248. Know what to do in case of a radio active spill.	RADIOLOGICAL INSPECTION 235. Understand radiation exposure. 236. Ability to use dosimeter and gieger counter. 237. Understand isotopic forms of elements. 238. Know the significance of alpha, beta, and gamma exposure. 239. Understand hazards of continuous x-ray exposure. 210. Know acceptable disposal sites. 241. Know, who is responsible for disposal of radio-active waste. 242. Know effect of radiation on, living tissue. 243. Have ability to monitor radiation from x-ray machine. 244. Know fission from fusion. 245. Ability to cooperate with Civil Defense Department in catastrophe. 246. Understand "half life" of an isotope. 248. Know what to do in case of a radio active spill.	RADIOLOGICAL INSPECTION 235. Understand radiation exposure. 236. Ability to use dosimeter and gieger counter. 237. Understand isotopic forms of elements. 238. Know the significance of alpha, beta, and gamma exposure. 239. Inderstand hazards of continuous x-ray exposure, 210. Know acceptable disposal sites. 241. Know who is responsible for disposal of radio-active waste. 242. Know effect of radiation on, living tissue. 243. Have ability to monitor radiation from x-ray machine. 244. Know fission from fusion. 245. Ability to cooperate with Civil Defense Department in catastrophe. 246. Understand the term; Electron, Proton, Neutron. 247. Understand "half life" of an isotope. 248. Know what to do in case of a radio active spill.

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	2 to Understand use of protective clothing & devices.			لـــا
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	INDUSTRIAL SANITATION	A	B	C
	250. Ability to run carbon monoxide field test.		·	
·	251 Ability to recognize dangerous situations in industrial plants.			
:	252. Know good housekeeping practices.		<u> </u>	
ar .	253. Understand occupational diseases caused by harmful situations.	1		
	254. Understand hysiological distress due to agents in industrial atmosphere.		<u>.</u>	
,	255. Understand abnormal stress due to improper work methods.			
	256. Ability to work with piant safety officer.	—		
٠.	257. Recognize agents causing disabilities.	↓—		├ .
	258. Recognize conditions causing disabilities and accidents.	┼		
,	259. Know what safety devices are needed in a given situation.	↓		
	260. Know which agents may cause respiratory disease.	-		
	261. Know which agents may effect the skin.	 	ļ	
	262. Know which State Department is responibile in case of an industrial accident.	↓ —	-	
` ,	263 Ability to evaluate an industrial hygiene problem.	┦		
, 1	261 Have completed Red Cross First Aid Training.			<u> </u>
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· · · · · · · · · · · · · · · · · · ·		·		

INSECT CONTROL	Ā	В	С
205. Understand use of keys in insect identification.			
266. Know mai or disease spread to man by insect.			
"67c Know ma cts of public health importance.			7:
268. A now life cycles of insects of public health importance.			
269. Know proper use of insecticides.		,	•
270. Know how to calculate ppm and mix insecticides.			
271. Understand vector borne disease transmission.			ξ.
272. Know intermediate hosts of insects of public health importance.			٠,
273. Know materials in which flies will lay eggs.			
2 4. Know sanitary storage methods of insect breeding materials.			,
275. Know mosquito control methods.			
276. Ability to recognize mosquito breeding areas.			
277. Understand water ponding control as a mosquito control tool.			
278. Know the flight range of various mosquitos.			,
279. Know naturalistic mosquito abutement methods.			

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INSTITUTIONAL INSPECTION	A	В	C
25. Know the route of infection transmission in nursing homes.			•
200 Ability to recognize unclean conditions by sight and smell.			
207. Know illumination standards for institutional kitchens.			
208 Know water volumn per bed and temperature standards for nursing home.			
199 Know proper use of pesticides in all types of institutions.	-		•
100 Know and apply occupancy standards to all types of institutions.			
101 know methods of dyinfecting operating rooms.			
At how we ptable methods of cleaning & disinfecting different kinds of floors.	,		
2012 Anderstand proper location of air intake and exhaust systems.			,
401 Know proper handling methods of soiled mops.			
300 Know when our caps are required on plumbing fixtures.		^,	
10. Know and as methods of disposal of dressings and laboratory cultures.	[•		
δπον cleaning methods of refuse shoots & dumb waiters.	١.		
Anow difference in requirements of cross infection control in nur-ing homes and he patalogical	****		
(0) Understand outed Landry Landling problems in instinctions.			
A MARINE A TANA A TANA A TANA A TANA A TANA A TANA A TANA A TANA A TANA A TANA A TANA A TANA A TANA A TANA A T		·	********

